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THE
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TO
DISEASES AND INJURIES
OF THE
EYE AND EYELIDS

LOUIS H. TOSSWILL

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THE

GENERAL PRACTITIONER'S GUIDE

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EYE AND EYELIDS

BY

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PREFACE

KNOWING how little time the general practitioner can devote to professional reading, and [illegible] frequent interruption [illegible] espe-cially [illegible] With this [illegible] those diseases and injuries [illegible] most frequently [illegible] myself [illegible] similar [illegible]

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PREFACE.

Knowing how little time the general practitioner can devote to professional reading, and to what frequent interruptions he is liable, I have especially aimed at brevity in the following pages. With this end in view I have only treated of those diseases and injuries of the eye which are most frequently met with, and have restricted myself to stating, as briefly as possible, what has seemed most worthy of record concerning them.

This little manual is not written for those who have plenty of time at their disposal, and who can study more comprehensive works, such as those of Soelberg Wells, Brudenell Carter, Lawson, and Nettleship, to which I have been long indebted for much valuable information.

EXETER,
December, 1883.

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PART I.

DISEASES OF THE EYE AND EYELIDS.

CHAPTER I.

EXAMINATION OF THE EYE.

MUCH time would often be saved, and many a serious mistake in diagnosis avoided, if every eye were examined methodically. It is a good plan to elicit first of all what symptom or symptoms have induced the patient to seek advice, and then to inquire into the history of the case, briefly, but still sufficiently to ensure being told all important particulars respecting it.

Then look at the eye as a whole, without noting the condition of the separate structures; observe whether one or both eyes are affected, and what symptom is most noticeable. Next glance quickly but carefully over each structure in succession; it matters little in what order this is done, provided the same is always followed; I would, however, suggest the following as a convenient arrangement :—

External surface of eyelids.
Margins of eyelids.
Lachrymal apparatus.
Conjunctiva (ocular and palpebral).
Cornea.
Anterior chamber.
Iris.
Pupil.
Lens.

Whilst recommending a most careful examination of each part in succession, I think it advisable to utter a word of caution, which is perhaps the more needed, the more painstaking the surgeon. Take care lest in noting the exact condition of each individual structure you overlook the general appearance of the eye as a whole, and its bearing on the case. Always examine both eyes, even though one eye appear to be perfectly normal, for, supposing it be so, yet it is of the greatest possible advantage in examining diseased structures to have a normal standard for the purpose of comparison.

Whenever there is reason for suspecting disease or injury of iris or lens, use atropine. In all cases of injury to the cornea, iris, or lens, or when there is any probability of a foreign body being embedded in either of these structures, or when there is reason for suspecting the presence of cataract, the eye should invariably be examined by *oblique illumination* (page 8). In many cases it is advisable to ascertain the amount of vision possessed by each eye (page 9). It is well to ascertain the tension in every case, but it is imperative to do so if there be any suspicion of glaucoma (page 9). In this case also the field of vision should be tested (page 10). In young children, examination of the eyes is attended with unusual difficulties; for the best method of overcoming these, see page 11.

Diseases of the vitreous, retina, &c., and errors of refraction, are not touched upon in these pages, nor are those diseases and injuries of the eye which are either comparatively rare, or which are not likely either to be diagnosed or successfully treated, except by one who has special knowledge of ophthalmic work.

Systematic Examination of Eye and Eyelids.

The following are a few of the most important points:—

External Surface of Eyelids.—Notice whether the lids are reddened, discolored, or swollen, and whether either of the upper lids droops.

Margins of Lids.—Notice whether they are reddened, thickened, inverted, everted, or covered with tinea crusts, and whether the lashes are abnormal in size, number, and arrangement, remembering to keep a sharp look-out for stunted, ingrowing lashes, which often set up much irritation before they are detected.

Lachrymal Apparatus.—Notice whether there is any epiphora, and whether the puncta, especially the two lower, are normal in size, position, and general appearance; whether any swelling can be detected in the neighbourhood of the lachrymal sacs, and in all doubtful cases whether pressure over the sacs causes mucus or pus to exude from either of the puncta.

Conjunctiva (Ocular and Palpebral).—Notice whether it is swollen or vascular; if the latter, the character, degree, and position of the vascularity; since these points often tend to elucidate the true nature of the case: also notice whether there is any discharge from the conjunctiva, and, if there be any, its character. In all cases of accident notice whether the conjunctiva is lacerated, and whether there is any foreign body lying on its surface, or embedded in its substance, and in all doubtful cases evert the upper lid, and explore not only its conjunctival surface, but also the upper sulcus (page 12).

Cornea.—Notice whether there is any opacity, remembering that a very faint cloudiness, which is easily overlooked, may materially interfere with the acuteness of vision; notice whether there is any ulceration of, or pustule on, its surface, and whether any foreign body is lying on its surface, or more or less embedded in its substance. In any doubtful case it is advisable to inspect the cornea by *lateral illumination* (page 8). Notice whether there are any corneal vessels, and, if so, whether they seem to be confined to the cornea, or to run to it from the conjunctiva.

Anterior Chamber.—Notice whether the aqueous humour is colourless and transparent, and, if not, its character; whether the anterior chamber is of normal depth in an antero-posterior direction, and whether there is any appearance of pus at the bottom of it. When the eye has received a severe blow, make sure that the lens has not been dislocated into the anterior chamber (page 138).

Iris.—Notice whether the iris is of the same colour in each eye, remembering that some human beings, like sheep-dogs, have irides of different colours; whether it has the usual polished appearance of a healthy iris; whether there is any adhesion between iris and cornea (anterior synechia), and whether there is any growth from or exudation on its surface. In examining the iris, the use of *lateral illumination* is much to be recommended (page 8).

Pupil.—Notice the size of the pupil, remembering that this varies in a normal eye in proportion to the amount of light to which the eyes are exposed, especially observe whether the two pupils are of the same size; notice whether the pupil is circular, if not, of what shape it is, and whether it is normally contractile. To ascertain the latter fact, stand in front of the patient, who should face the light, and carefully cover each of his eyes in turn whilst the other is being tested. This is best done by suddenly interposing the hand between his eye and the light, and by as suddenly withdrawing it; a normal pupil will dilate when the hand is interposed, and contract considerably when it is withdrawn. When the pupil is not circular, or not normally contractile, or not normally black in appearance, it is always advisable, except in those cases where there is reason to suspect the existence of glaucoma, to put a drop of atropine (atrop. sulph. gr. ij ad ℥j aquæ) into the eye, and to examine the pupil half an hour erwards.

Lens.—It is always desirable to ascertain the state of the lens when there is any suspicion of cataract, or of a foreign body having entered the eye. For directions how to examine the lens, see chapter on Cataract, page 87.

CHAPTER II.

MEANS OF DIAGNOSIS.

Use of Atropine.—It is by no means uncommon to find that the atropine ordered by the surgeon has failed to act on the pupil, owing to the inefficient way in which it has been used by the patient's friends; I would therefore recommend the following as a tolerably sure method, even in the hands of clumsy and inexperienced persons. Let the patient lie on his back with his eyes closed, and let one or two drops of the atropine solution be dropped into the inner canthus of the eye, at the point where the lids meet; if the lids be then separated with the forefingers, the atropine will fall between the lids into the *cul de sac* between the lower lid and the eyeball. The eyelids of young children should be wiped as soon as possible afterwards. The *sulphate* of atropine should invariably be prescribed when atropine is needed.

Lateral, Oblique, or Focal Illumination.—The patient should be seated in a room as much darkened as possible, and a lamp with its globe removed should be placed on the same side as the eye to be examined, with its flame on a level with and a little in front of it, and distant from it about two feet. By means of a bi-convex lens of from two to three inches focus, the light from the lamp is concentrated upon the eye, and by altering the position of the lamp and of the lens, and by making the patient look in different directions, the light can be thrown at various angles upon the eye, so as to illuminate in succession every part of the cornea, iris, and pupil. In many cases the use of atropine much enhances the value of this method of examination.

Examination of Vision.—A correct diagnosis is often facilitated by ascertaining the amount of vision possessed by the patient, especially when he complains of defective sight. Various test-types are used for the purpose, but, if none of these are at hand, newspapers, books, and the various objects of every-day life, will enable any one of ordinary intelligence to form an approximate estimate on the subject. It is a good plan to invariably test *both* eyes, and to test the worst eye first, as otherwise the patient may appear to see with it what in reality he remembers to have seen with the other eye.

Estimation of the Degree of Tension.—It requires much practice to acquire the *tactus eruditus*, in estimating the degree of tension of an eyeball. It is advisable always to test both eyes, and always, when possible, to adopt the same method of procedure. Stand opposite your patient, and telling him to put one of his hands near the lower part of his chest, direct him to keep his eyes fixed on it; then, standing firmly on both feet, put the tips of your two forefingers on one of his upper lids, not far from each other, and in see-saw fashion press alternately with them on the eyeball, as if examining for fluctuation; the pressure must be in a downward direction, and the patient must keep his eyes in the same direction all the time.

Measurement of the Field of Vision.—To measure the field of vision accurately, a perimeter is required; but a rough estimate of it may be obtained in the following manner:—Stand opposite the patient at a distance of two or three feet, keeping your face on a level with his; then cover one of your eyes, and let him do the same, only if you cover the left, he must cover the right, and *vice versâ*. Then look steadily at his uncovered eye, and direct him to keep it fixed on yours. Next, put your hand halfway between his face and yours, and slowly move it upwards, keeping it at an equal distance from each face, and directing him to inform you when he can no longer see it. When it has completely disappeared from the view of both, slowly bring it back again, and notice whether it disappears and reappears simultaneously to you both. Your hand must then be again placed halfway between your face and his, and be moved successively downwards, to the left, and to the right, in exactly the same way in which it was moved upwards. It is essential that your own field should be a normal one, and that both you and your patient keep steadily looking at each other's eye, and, moreover, that your hand be kept throughout at an equal distance from each face.

Examination of the Eyes in Young Children.

In a case where from photophobia, shyness, or fear, or possibly from all these causes combined, it appears almost impossible to examine the eyes satisfactorily, a gaudily-dressed doll held in front of, and a little above, them, often acts as an "Open Sesame." If this little stratagem fail, the nurse and the surgeon should sit opposite each other, and sufficiently near for their knees almost to touch, and the child should be laid on his back in his nurse's lap, with the back of his head between the surgeon's knees. The nurse should secure his hands, and as far as possible keep him still, whilst the surgeon can hold his head as firmly as he pleases with his knees. The lids should be carefully dried, and then separated by pressing the edge of the upper lid up over the eyeball with the tip of one forefinger, whilst the other depresses the lower lid.

If the surgeon fail to achieve his purpose, owing either to the swelling of the lids, or to the almost invincible tendency to eversion of them, which is sometimes met with, it is best to give the child an anæsthetic, remembering to provide a pair of forceps for dragging down the eyeball, if, as is often the case, the cornea remains hidden behind the upper lid.

Eversion of the Upper Lid and Exploration of the Upper Cul de Sac.—The practised surgeon can evert the upper lid with unaided fingers, but the inexperienced is advised to adopt the following method:—Stand *behind* the patient, who should be seated in a chair, with the back of his head somewhat tilted backwards, and resting against your chest. Then press upon his upper lid, half an inch from the margin, with a small probe bent at an obtuse angle, the convexity being towards the brow; by this means the margin of the lid will be tilted upwards, and then either the edge of the lid or the eyelashes should be seized by the forefinger and thumb of the disengaged hand, and by a sudden movement jerked upwards and backwards, thus bending the lid upon itself. This little manœuvre is facilitated by the patient looking down as it is being executed.

If you wish to explore the upper sulcus, gently withdraw your probe, still keeping the lid everted, and then, standing in *front* of your patient, with the convexity of your probe lift the everted lid sufficiently from the eyeball, to enable you to look up into the *cul de sac.*

CHAPTER III.

CATARRHAL OPHTHALMIA.

Catarrhal Conjunctivitis, Acute Conjunctivitis, Muco-purulent Ophthalmia.

CATARRHAL ophthalmia is the term generally applied to an acute inflammation of the conjunctiva, which generally attacks both eyes, though one eye is often affected a day or two before the other; it may be met with at any age, is extremely contagious, and sometimes epidemic. It may be caused by exposure to cold or wet, by excessive light or heat, by undue use of the eyes, by direct contagion, or by the presence of a foreign body; moreover, it is not an uncommon sequel of measles and scarlet fever.

Symptoms.—The attack generally commences with a feeling of discomfort in one or both eyes, attended with lachrymation; the tears are soon replaced by mucus, which before long makes way for a somewhat abundant, light yellowish, muco-purulent discharge. The conjunctival injection is often considerable, and occasionally attended with some swelling of the ocular conjunctiva (chemosis). Frequently the eyelids are somewhat red and swollen, especially at the edges, and they generally get stuck together during sleep, little scabs formed of dried secretion being often found on the lashes. There is at no time much pain felt, but a disagreeable sensation, as of sand in the eye, is experienced almost from the commencement of the attack.

Diagnosis.—This rests mainly upon the following points—upon the vascularity being superficial, upon its being least intense near the cornea, and upon its being often associated with patches of extravasated blood; upon the discharge being stringy and muco-purulent; upon the sensation being experienced as of sand in the eye; upon the cornea, iris, and pupil appearing normal; upon vision being nearly or quite normal; upon photophobia being almost if not entirely absent, and upon both eyes being generally affected.

Prognosis is very favourable when judicious treatment is adopted, although cases vary much in severity; it is not unusual for complete recovery to take place in one or two weeks, or even less.

Treatment.—In mild cases the eye should first be freed from all discharge by the liberal use of cold or tepid water, and then an astringent wash should be applied; this may be repeated several times daily.

In less mild cases it is advisable to preface the use of the astringent with hot fomentations, poppy water being especially useful for this purpose; this treatment may be repeated every two or three hours, or oftener.

In more severe cases, at any rate, whenever in the early stages of the complaint, there is much congestion and irritation, with scanty discharge, it is well at first only to apply hot fomentations to the affected eye, and to re-apply them at frequent intervals. As soon as the congestion and irritation are less, and the discharge comes more freely, the use of astringents should be cautiously commenced, whilst the hot fomentations should be gradually discontinued. There is no better astringent for these cases than alum, and a solution of it (gr. ij–vi ad ℥j aquæ) will generally suffice to bring about a speedy cure. The lotion should be got well inside the lids, and if the patient by manipulating them cannot effect this end, it should be applied by means of a brush or quill. If the alum wash fail to do good, one of the other preparations mentioned below should be tried. At night the edges of the lids should be smeared with a little vaseline or spermaceti ointment; or in case they are excoriated, with the diluted nitrate of mercury ointment (ung. hydrarg. nitrat. 1 to 8 or 12 vaseline).

Drugs need not be administered internally except in severe cases, when an effervescing mixture in the earlier stages, and a tonic (quinine, gentian, iron, &c.) in the later, can be given.

The eyes should be rested as much as possible, and all exposure to cold avoided. Amongst other applications recommended for this affection are solutions of sulphate of zinc, sulphate of zinc combined with sulphate of alum, sulphate of copper, nitrate of silver, borax, chloride of zinc, and tannin, used in various strengths, from one grain to an ounce of water, and upwards.

CHAPTER IV.

CHRONIC OPHTHALMIA.

CASES of catarrhal ophthalmia which have not been treated at all, or which have been wrongly treated, are liable to become chronic, though probably few do so, save those which were originally of a severe character. Chronic ophthalmia of a variable type is often met with in children after one of the exanthemata, but most frequently after measles. It is often seen in adults who are troubled with some error of refraction, which has not been corrected by suitable glasses, or who suffer from epiphora. It may be caused by any local irritant, and those whose health is below par are especially liable to it, particularly if their work has been of a nature to try their eyes.

Symptoms.—Whilst the ocular conjunctiva remains almost free from injection, the palpebral conjunctiva becomes of a reddish or even dark red colour, swollen, and studded over with a number of papillary granulations, which must be carefully distinguished from the granulations of the lids met with in granular ophthalmia (*see* page 33). The hypertrophied conjunctiva secretes mucus in unusual quantity, a muco-purulent discharge being the exception; the edges of the lids are frequently crusted with dried mucus, and the caruncle is unusually conspicuous. The eyes are very prone to flush on slight provocation, and a bright light causes a feeling of discomfort.

Prognosis.—The disease is often very obstinate, especially in the old and feeble, frequently lasting for many weeks or even months.

Treatment.—The successful treatment of chronic ophthalmia depends in the first place upon all irritant causes being removed; no work that is trying to the eyes should be allowed in any case, and absolute rest of them should be enjoined when they have been previously overused; the general health should also have particular attention paid to it.

When an error of refraction is the exciting cause, suitable glasses must be ordered, and in cases of epiphora an operation must, if necessary, be performed.

The use of astringent lotions is of primary importance, and one after another must be tried, if necessary. Amongst the most useful are solutions (varying in strength from 1 or 2 grains and upwards to the ounce of water) of sulphate of alum, sulphate of zinc, sulphate of alum combined with sulphate of zinc, and borax. In obstinate cases, solutions of nitrate of silver, chloride of zinc, sulphate of copper, or acetate of lead can be used.

Counter-irritation is sometimes very beneficial; a blister behind the ear or a seton inserted in the temple are the best forms of it.

CHAPTER V.

PURULENT OPHTHALMIA.

Purulent Conjunctivitis, Contagious Ophthalmia,
Egyptian Ophthalmia.

THERE are three principal varieties of this formidable complaint, known respectively as,

Gonorrhœal Ophthalmia.
Ophthalmia Neonatorum.
Purulent Ophthalmia (*of adults*).

The first variety is due to direct contact with gonorrhœal matter; the second is only met with in infants; the third is the form generally met with in adults. I propose first to mention those symptoms and general characteristics which are common to all three varieties, and then those which are peculiar to each.

Purulent Ophthalmia is generally due to inoculation with purulent matter, but may become epidemic and spread without direct contagion, especially when people are living crowded together under bad hygienic conditions. It is probable that under these conditions catarrhal ophthalmia may assume a purulent type. The disease sets in from six to forty-eight hours after exposure to direct contagion. It is often attended with severe constitutional disturbance, and may affect one or both eyes.

Symptoms.—The symptoms of purulent ophthalmia are at first almost, if not quite, identical with those of catarrhal ophthalmia, and the same remark also holds good at a later stage, when comparing a severe case of catarrhal and a mild case of purulent ophthalmia. In general, however, the two diseases are easily distinguished from each other at a very early stage; for, though many of their symptoms resemble each other in their general character, they differ widely in respect to severity.

In purulent ophthalmia both ocular and palpebral conjunctiva soon become very swollen and injected, the swelling of the ocular conjunctiva (chemosis) being often very marked. The lids rapidly become much swollen and œdematous, so that often it is difficult to get a look at the cornea; this should, notwithstanding, be examined daily, since on its tendency to slough or ulcerate depends mainly the gravity of the affection: the examination should, however, be made with the utmost care, since otherwise a threatened perforation may very easily become a *fait accompli.* The pain is often very severe, especially before the discharge becomes plentiful; the discharge quickly becomes purulent, and is often very abundant, the thick yellow matter welling up as soon as the lids are separated.

Diagnosis.—Purulent ophthalmia can only be mistaken for catarrhal ophthalmia; and, save in the exceptional cases already mentioned, the greater severity of the symptoms in the former complaint prevents the one from being mistaken for the other.

Prognosis.—This is considerably influenced by the general condition of the sufferer's health previous to the attack, but we judge of it in general by the state of the cornea. If the latter is hazy, and still more if it is ulcerated, or shows a tendency to slough, the prognosis is proportionately grave, and especially so if the above symptoms set in early. Purulent ophthalmia, however skilfully it may be treated, generally lasts for some weeks, and in very severe cases, or where it has been either wrongly treated, or not treated at all, it may become chronic and continue for an indefinite period.

Treatment.—I have mentioned that in the early stages purulent ophthalmia cannot be distinguished from catarrhal ophthalmia, and that even in later stages a mild case of the former, and a severe case of the latter, are scarcely, if at all, distinguishable from each other. In all doubtful cases, therefore, the treatment should be more or less tentative. Whenever, however, from the history of the case, or its special symptoms, we have reason to believe that we are called upon to treat the former complaint, it is advisable to postpone the use of astringents, and *à fortiori* of strong astringents, until the diagnosis has been established.

We should begin by removing the discharge, and fomenting the lids with soothing or sedative applications, frequently applied—poppy fomentation, belladonna fomentation (ext. belladon. ʒj–ʒij ad Oj aquæ), or even warm water. At the same time a free purge should be ordered, and this in plethoric persons should be followed by effervescing salines, but in weakly persons by tonics, of which quinine and iron, and in some cases ammonia, are the best. In the latter class of patients, a generous diet and a certain amount of stimulant are urgently called for, especially after the disease has passed into the suppurating stage. When there is severe pain at night, opium is sometimes of considerable benefit.

If the case be one of purulent ophthalmia, the symptoms as a rule rapidly become aggravated, and, in proportion as the discharge becomes more copious, the use of astringents is more and more indicated. There are two which are especially useful, namely, alum and nitrate of silver. The former can be used in any case, and in the milder cases will suffice by itself to bring about a cure; it should be used in strengths varying from 2–10 grains to the ounce of water, according to the severity of the case. Some authorities recommend a combination of alum and sulphate of zinc (2 grains of the latter, and 2–6 grains of the former to an ounce of water).

In all cases where a lotion is used the eye should be first thoroughly cleansed from all discharge, by freely bathing it with warm or tepid water. The application of the astringent wash can hardly be made too often; in a severe case, attended with profuse discharge, it is often required every hour, or even oftener.

In severe cases it is not wise to trust entirely to either of the lotions just mentioned; but we must use nitrate of silver in addition, either in solution or in a solid form (diluted). Some surgeons prefer the former, some the latter, most, however, are agreed that the unmitigated stick of nitrate of silver should scarcely ever, if indeed ever, be used. If nitrate of silver is used in solution, its strength should be in an inverse ratio to the frequency with which it is proposed to employ it. A strong solution of 10–20 grains to the ounce of water, should only be used once, or at the outside twice, in the twenty-four hours; whilst one of 4–10 grains can be used three or four times during the same period, and one of 2–4 grains every 4–6 hours. The solid nitrate of silver is used in the form of *sticks* in which the silver salt is fused with different proportions of nitrate of potash (2 or 3 of the latter to 1 of the former being best). The mitigated stick should be lightly and quickly applied to the everted *palpebral* conjunctiva, which should be bathed immediately afterwards with salt and water, and this in turn should be followed by a copious bathing with cold water.

The eye should be washed with salt and water in all cases where a solution of nitrate of silver has been used of greater strength than 2 grains to the ounce; at any rate, it is safer to do so. The nitrate of silver, whether in stick or solution, should never be used when the discharge is not abundant, even though at an earlier period it may have been so. When the mitigated stick, or a strong solution of nitrate of silver, has been used, it is advisable to apply temporarily cold wet compresses (if possible *iced*) to the outside of the lids; great relief being thus afforded, besides the effects of the astringent being materially increased.

The use of iced water or iced compresses, applied more or less constantly to the lids, has been strongly recommended as of great value in the treatment of this affection; but it is probably worse than useless unless persistently carried out, and this, in many cases, is practically impossible.

In all severe cases it is advisable to apply 4–6 leeches to the temple or brow, taking care that none are applied *on*, or even within half an inch of, the eyelids. When there is much swelling of the ocular conjunctiva (chemosis), incisions, radiating from the cornea, should be made in it pretty freely with a pair of scissors. It is always advisable to smear the edges of the lids with a little vaseline, or some other simple ointment, and when the eyes are being frequently bathed it is well to smear the whole exterior of the lids. When the cornea is ulcerated, or is in evident danger of sloughing, it is advisable to use warm poppy or belladonna (ext. belladon. ʒj–ʒij ad Oj aquæ) fomentations, but this need not interfere with the free use of alum lotion if the discharge remains copious.

In all cases where one eye only is affected the other must be most carefully guarded from the risk of contagion, by the use of lint, plaster, and bandage.

Gonorrhœal Ophthalmia.

This affection is mainly distinguished from other forms of purulent ophthalmia by two peculiarities :—

1. That it is invariably due to the contagion of gonorrhœal matter.
2. That it is the severest form of ophthalmia known.

As might have been expected, all the symptoms of purulent ophthalmia are intensified in gonorrhœal ophthalmia, and the cornea is more in danger than in any other variety of ophthalmia. The disease, as a rule, attacks only one eye, and that generally is the right ; it commences within forty-eight hours of exposure to contagion, and, strange to say, it is a comparatively rare affection.

Treatment.—The treatment of gonorrhœal ophthalmia in no respect differs from that recommended, in the last chapter, for severe cases of purulent ophthalmia, save that it must, if anything, be more active. As the disease generally attacks only one eye, it is highly important to guard the other from infection by means of lint, plaster, and bandage. We must not forget that gonorrhœal ophthalmia is generally attended by an unusually depressed condition of the general health.

Ophthalmia Neonatorum.

Ophthalmia neonatorum is not only the most important of the ophthalmias, but it also yields in importance to no other affection of the eye, since it is believed to have caused nearly half the blindness in this country. This is due to the fact that it is a disease which, though unfortunately far from rare, is very apt, if wrongly treated, or even if left untreated, to destroy vision. That such a result should so often occur is the more to be regretted, because there is perhaps no affection of the eyes in which correct treatment is more certainly followed by recovery. Indeed, one well-known oculist has stated that ophthalmia neonatorum when properly treated "ought to terminate in complete recovery in every instance." I venture, however, to think that this assertion goes too far, and that occasionally, though rarely, an eye is lost from this affection, notwithstanding the most careful and skilful treatment.

Ophthalmia neonatorum differs in many respects from other forms of purulent ophthalmia. It occurs only in infants, and almost always begins from two to four days after birth, though occasionally it does not make its appearance for some weeks afterwards; it is generally due to the eyes coming in contact during childbirth with a leucorrhœal discharge of the mother, though occasionally a gonorrhœal discharge is the cause of it; it may, however, be caused by ordinary irritants—*e.g.*, dirt, cold, or even a bright light. As a rule both eyes are affected, but generally one eye has a few hours, sometimes a few days, start of the other. The lids are generally more swollen than in any other form of purulent ophthalmia, and there is often a tendency to ectropion.

Treatment.—The treatment of ophthalmia neonatorum does not differ materially from that of other forms of purulent ophthalmia, save that less powerful remedies are needed, ice and leeches being seldom, if ever, required, and scarification of the conjunctiva but seldom. Most cases can be cured by the abundant use of cold or tepid water, combined with the almost equally free application of alum lotion (gr. ij–iv ad ℥j aquæ).

In unusually severe or obstinate cases, in addition to this treatment, a solution of nitrate of silver (gr. ij–x ad ℥j aquæ) can be applied to the *palpebral* conjunctiva once a day *by the surgeon.* The eye should subsequently be bathed with salt-and-water, and then be freely washed with cold or tepid water. For directions how to examine an infant's eyes, see page 11.

Purulent Ophthalmia of Adults.

There is but little to be said under this head, as the symptoms of purulent ophthalmia in general are practically the symptoms of this variety as well. It runs a less severe course than gonorrhœal ophthalmia, and it is, as a rule, less amenable to treatment than ophthalmia neonatorum. It is due to a considerable variety of causes.

CHAPTER VI.

GRANULAR OPHTHALMIA.

Granular Conjunctivitis, Granular Lids, Trachoma.

THE above terms are applied to an extremely important disease affecting the palpebral conjunctiva, which may undergo very marked changes during its course. This disease is not commonly met with before puberty, nor in the aged; as a rule, both eyes become affected sooner or later; the conjunctival discharge is undoubtedly contagious, and is capable of producing other affections of the conjunctiva besides granular disease. Bad hygienic conditions, and especially overcrowding; insufficient or innutritious food; a low state of vitality, and malaria are the principal predisposing causes, and it is easy to understand, therefore, why it is so prevalent in workhouses and large cities.

Symptoms.—In the earlier stages the conjunctiva of one or both lids becomes swollen, roughened, and vascular. On everting the lid, its palpebral surface will be found studded with a number of red, granular bodies, which vary considerably in size and number ; sometimes the granular bodies are pale and resemble boiled sago. The patient's attention is not unfrequently drawn to his lids by a feeling of roughness, and the upper lid often droops.

After a time, if the lids have not been treated, or have been treated badly; and sometimes, whatever treatment may have been adopted, the hypertrophied conjunctiva gradually becomes converted into a dense cicatricial tissue, marked sometimes by deep scars; in consequence of this the palpebral fissure is often sensibly contracted. Another consequence of this conjunctival contraction is that the edges of the lids are often turned inwards, and that some of the lashes sweep over the surface of the eyeball. Sometimes there is considerable purulent discharge, with lachrymation; in some cases there is marked photophobia, and considerable pain is occasionally experienced.

In many cases of granular ophthalmia, and in most chronic cases of it, a peculiar form of corneitis is met with, which is known as *pannus;* and as it is directly due to granular disease, it is usually termed *trachomatous pannus.* Part of the cornea, and sometimes the whole of it, is found to have developed a layer of new cells and blood-vessels beneath its epithelium, and it is characteristic of this condition that many of the vessels in question commence in the ocular conjunctiva, run over the margin of the cornea, and are continued in this new tissue ; the cornea thus becomes highly vascular, and more or less opaque and fleshy.

Trachomatous pannus is caused by the friction of the granular bodies against the cornea, aided in many cases by the inversion of the edges of the lids and of the lashes, so often found in this complaint. As these exciting causes are generally found most marked in the upper lid, the upper half of the cornea is far more liable to pannus than the lower, though in severe cases the whole cornea is equally affected.

Diagnosis.—In all suspicious cases the conjunctiva of both upper and lower lids should be carefully examined, since the characteristic appearances of the conjunctiva determine the diagnosis at once. It must not, however, be forgotten that the condition of the conjunctiva in the acute stage is very different from what it is in the chronic. The diagnosis is made still easier when pannus is present, especially if it be confined to the upper half of the cornea.

Prognosis.—Suitable and systematic treatment will considerably benefit almost every case, if treated sufficiently early, and most cases under these circumstances will be completely cured. If neglected, however, the disease often proves most obstinate, it is very apt to recur, and a complete cure is often not obtained. The amount of vision retained by the patient depends upon the extent and character of the corneal mischief.

Treatment.—In the early stages of this complaint, if the symptoms are at all of an acute character, it is well to observe the rule laid down in the treatment of other conjunctival affections—namely, to abstain from the use of caustics, or even of astringents, and to content oneself with soothing applications as long as the symptoms are of this nature. Fotus papav. and fotus belladon. (ext. belladon. ʒj–ʒij ad Oj aquæ) are well suited for this purpose, and if there is any reason to suspect that the cornea is implicated, atropine (atrop. sulph. gr. j–ij ad ℥j aquæ) should be used twice a day. Cold wet compresses and a light bandage are often of much service in this stage, especially if the lachrymation, photophobia, and pain are at all excessive.

When the acute symptoms have subsided, the essential treatment consists in applying astringents to the granular bodies, and the same treatment must be pursued from the beginning, when the symptoms are of a chronic rather than of an acute character.

Amongst the best applications are sulphate of copper and nitrate of silver. The sulphate of copper can be used in solid stick or point, or diluted with alum and nitrate of potash, in the shape of *lapis divinus* (green stone), or in solution of greater or less strength. Authorities differ as to which of these forms is best, but in almost all cases it is safer to use the green stone than the solid unmitigated stick or a strong solution.

The green stone should be used as follows:—The lid being everted, and gently dried with a soft cloth, *lightly* sweep over the whole affected part of the conjunctiva with the stick of green stone (put in a quill for convenience of holding it), successively touching each of the granular bodies, but avoiding the rest of the conjunctiva as much as possible. Before replacing the everted lid, gently mop it with some wet rag. When all the affected lids have been thus treated, the eyes should be freely bathed with cold water to get rid of the excess of sulphate of copper. The application of green stone should be repeated twice a week, or oftener, according to the severity of the case, and the stage at which it has arrived. In the intervals, a solution of sulphate of copper (gr. ij ad ℥j aquæ) should be applied to the eyes night and morning, care being taken that some of the solution gets *within* the lids.

Many oculists prefer nitrate of silver to sulphate of copper; but it must be remembered that the former is much more liable to do mischief than the latter; that even the mitigated stick of nitrate of silver, or a strong solution of it, may do irreparable damage to the cornea, if accidentally brought into contact with it, and that deep cicatrices in the conjunctiva may be produced by its being carelessly used; moreover, there is danger of the conjunctiva being permanently stained, if it be used for any length of time.

With all these drawbacks, nitrate of silver is a very useful remedy in some cases, especially when it is advisable to replace the green stone by another application. It should never be used unmitigated, but either in solution (gr. v–xx ad ℥j aquæ), or in stick, diluted with 2–4 parts of nitrate of potash. As a rule, it is easier to localize the action of the mitigated stick than of the solution, and hence safer to use it. The mitigated stick should be applied in a similar way to the green stone; but, before replacing the everted lid the excess of nitrate of silver should be neutralized by a solution of common salt (gr. xx ad ℥j aquæ), which can be applied with a camel's-hair brush, and then the eye should be freely washed with cold water. A solution of nitrate of silver (gr. ij ad ℥j aquæ) can be used like a similar solution of sulphate of copper.

If for any reason it is advisable not to use sulphate of copper or nitrate of silver, or to discontinue the use of them, a solution of acetate of lead (gr. v–x ad ℥j aquæ) may be tried. This is sometimes very effectual, but it must not be used under any consideration if the cornea is affected, lest lead should be deposited there.

Amongst other local applications the following are the most noteworthy :—Tannin, alum, sulphate of zinc, chloride of zinc, tannate of lead, and liquor potassæ. The local applications must be changed from time to time, if the case does not progress satisfactorily.

If any lashes are inverted, they should be either plucked out, or removed with their bulbs, or their position rectified by operation.

When pannus is present, it is frequently advantageous to prescribe atropine (atrop. sulph. gr. j–ij ad ℥j aquæ), to be used once or twice a day, but its cure depends upon the removal of its exciting cause. The treatment of pannus must therefore be mainly directed towards curing the granular bodies, or the inverted lids or lashes which have produced it; for the same reason, if the palpebral aperture is much shortened, the outer canthus should be divided.

In very chronic cases of pannus, and where the granulations have been succeeded by cicatricial tissue, which keeps up the state of pannus; and above all, when the whole cornea is thus affected, the eye may be inoculated with the pus of purulent ophthalmia, or the operation of peritomy may be performed. The limits and scope of this little work render it quite impossible for me to discuss the details of either mode of treatment, or to define the cases for which each is most suitable; suffice it to say that both are occasionally most valuable aids to ordinary treatment.

In the treatment of granular ophthalmia, particular attention must be paid to the general health; tonics, as a rule, will be required, perchloride of iron being the most generally useful; the patient must, if possible, be placed under different hygienic conditions from those in which the disease has become developed.

CHAPTER VII.

PHLYCTENULAR OPHTHALMIA.

Pustular Ophthalmia, Phlyctenular Conjunctivitis, Pustular Conjunctivitis, Conjunctival Herpes.

WITH this affection of the conjunctiva is often confounded the corresponding disease of the cornea, from which, however, it differs considerably. Nevertheless as there are many cases in which both tissues are attacked at the same time, and as the two complaints have much in common, I propose first to describe the disease as it affects the conjunctiva, and in the next chapter to mention how it becomes modified when it attacks the cornea.

This form of conjunctival inflammation is extremely common amongst children, though it is hardly ever met with in infants, and but rarely in children under three. It becomes much rarer after puberty, and is as rarely met with amongst men and women over thirty, as it is in children under three. Children suffering from it are, in a large majority of cases, of a strumous diathesis, and it is directly due in many cases to bad hygienic conditions developing the scrofulous taint; in many cases it first makes its appearance after an attack either of measles, or of one of the other exanthemata.

Symptoms.—The first local indication of phlyctenular conjunctivitis is the presence of one or more small patches of conjunctival vascularity, generally situated somewhere near the corneal margin. In the course of a few hours, or, at the outside, of a day or two, one or more small papules make their appearance in the midst of the vascular patches, these rapidly pass through a vesicular and pustular stage, and then burst, forming minute ulcers. These little elevations, which are called phlyctenulæ, are about the size of a pin's head, and are almost always situated either just outside the corneal margin, encroaching somewhat upon it, or more or less within it: if the latter, the case is one of phlyctenular corneitis, with which at present we have nothing to do, Sometimes only one phlyctenula appears, and in some cases there are several, the vascularity being generally proportionate to the number of the phlyctenulæ.

Attendant on the development of the phlyctenulæ is a certain amount of lachrymation and photophobia, and a feeling of heat, which sometimes amounts to pain, though none of these symptoms are, as a rule, of a severe character; in this respect differing widely from what occurs in phlyctenular corneitis. It is noticeable, however, that the photophobia is much greater when the phlyctenulæ are situated near the corneal margin, than when they are at a distance from it.

Diagnosis.—The more or less localized patch of vascularity, with the minute phlyctenula in its midst, renders the diagnosis of phlyctenular conjunctivitis an easy matter.

Prognosis.—An ordinary case runs its course in a week or two, and few, if any, ill-effects are left behind, but the disease is very prone to recur. In rare cases, the ulcer which succeeds the phlyctenula, invades the deeper tissues, and an intractable and dangerous ulceration is the result.

Treatment.—If the inflammation is of an acute character, as evidenced by considerable photophobia, lachrymation, and vascularity, it is advisable to commence the treatment with the use of a weak belladonna fomentation (ext. belladon. ʒj–ʒij ad Oj aquæ), with which the eye should be bathed several times a day.

As soon as the acute symptoms have subsided, and in other cases from the commencement, we must use one of the two drugs which, when applied locally, exert more or less of a specific influence upon phlyctenular inflammation; I allude to calomel and yellow oxide of mercury. A little calomel should be jerked from a quill or camel's-hair brush upon the surface of the phlyctenulæ, and if no irritation is produced, the powder should be similarly applied three or four times a week, or even daily. The yellow oxide of mercury is most conveniently used as an ointment (gr. iv–xvj ad ℥j vaseline). It is advisable to begin, at any rate, with an ointment of four or eight grains to the ounce, since the weaker preparations often answer remarkably well, and the stronger sometimes cause considerable irritation. A little of the ointment should be smeared once or twice a day along the edges of the lids, or a little may be placed just inside the edge of the lower lid. The yellow oxide is not only extremely useful in cutting short the affection, but is also believed to exert a most beneficial influence in preventing relapses.

The constitutional treatment is especially important in an affection so prone to recur. Defective hygienic conditions must be at once remedied, and nothing but wholesome food allowed; whilst particular attention should be paid to the bowels. Much benefit accrues from the use of suitable tonics, iron and quinine being the best; vinum ferri is an excellent preparation when the disease occurs in a young child.

CHAPTER VIII.

PHLYCTENULAR CORNEITIS.

Phlyctenular Ophthalmia, Strumous Ophthalmia, Herpes Corneæ, Recurrent Vascular Ulcer of Cornea.

As this disease, in most essential points, resembles and is almost identical with phlyctenular conjunctivitis, I do not propose to recapitulate those symptoms and other characteristics of that complaint which are common to both affections, but mainly to confine myself to the points in which phlyctenular corneitis differs from phlyctenular conjunctivitis. Speaking broadly, the corneal affection differs from the conjunctival one in being generally of a much severer character, and there are also certain differences which are due to different tissues being involved.

Symptoms.—The phlyctenulæ differ much in size, number, and position; sometimes they are very small, especially when near the corneal margin; sometimes they are numerous, sometimes only one is seen; they may be found on any part of the cornea, though they undoubtedly show a preference for the margin. The little vesicle which crowns the summit of the phlyctenula is frequently succeeded by a tiny ulcer, which very rarely enlarges to any extent, but slowly fills up. As a rule there is no injection of the conjunctiva save in the part nearest to the phlyctenula, where a small patch of vascularity terminates in a small leash of vessels which run across the margin of the cornea to the phlyctenula. The extent and situation of the vascularity bear a direct ratio to the number and position of the phlyctenulæ.

One of the most marked symptoms is photophobia, which is sometimes very intense; lachrymation is also commonly present, though not so constantly as photophobia. Pain, assuming the form of severe ciliary neuralgia, is much more frequently met with than in the corresponding conjunctival affection.

Diagnosis.—The phlyctenula, or phlyctenular ulcer, situated on the cornea; the, as a rule, localized vascularity of the conjunctiva; and the marked photophobia, point clearly to the true nature of the affection.

Prognosis.—Severe cases are often protracted, and in all there is a great tendency to recurrence; the milder cases sometimes leave no trace behind them, but frequently a dotted opacity remains after the disease has subsided.

Treatment.—The treatment is much the same as for phlyctenular conjunctivitis, but more caution is required in the early stages of the disease. In addition to the use of atropine or belladonna, a compress-bandage may often be used with advantage, especially when the photophobia is excessive. After a time, especially if the atropine causes irritation, an alum or borax wash (gr. ij–iv ad ℥j aquæ) may be used with or even substituted for it. In severe cases when the acute stage is over, calomel, or yellow oxide of mercury, is of much service, used as in phlyctenular conjunctivitis, in less severe cases either can be used from the beginning.

A seton in the temple, as a counter-irritant, is often most useful, especially in obstinate cases. In cases attended with excessive photophobia the cold douche sometimes gives great relief, and division of the outer canthus and orbicularis is also sometimes necessary. The syrup of the iodide of iron, or a simple preparation of iron with cod-liver oil is generally indicated. Some surgeons give vinum antimonialis (min. x–xx) two or three times a day, as long as the photophobia is well marked.

CHAPTER IX.

PANNUS, STRUMOUS CORNEITIS, MARGINAL CORNEITIS.

THERE are two principal varieties of pannus:

Trachomatous Pannus.
Phlyctenular Pannus.

The former, which is far the more important of the two, has already been described, together with its treatment, in the chapter on granular ophthalmia, to which disease it is directly due. Phlyctenular pannus is due, as its name indicates, to phlyctenular inflammation; it is much less vascular and opaque than the trachomatous variety, and it is not found associated, like the latter, with granular lids.

Strumous Corneitis (Strumous Keratitis).

This complaint may be considered as merely a variety of phlyctenular corneitis, its main distinction consisting in the greater severity of its symptoms. The strumous diathesis is generally well-marked in those who suffer from it; there is extreme photophobia, and a greater tendency to ulceration than in ordinary cases of phlyctenular corneitis. The treatment is much the same as in severe cases of the latter disease, but its strumous origin must be borne in mind whilst prescribing for it.

Marginal Corneitis (*Marginal Keratitis*).

Marginal corneitis varies considerably in character and severity, in some cases closely resembling phlyctenular corneitis, in others more nearly resembling interstitial corneitis. Its special characteristic is the presence of a vascular patch at the upper and lower borders of the cornea, each gradually encroaching upon it, until at length, in some cases, the greater part has been thus invaded. The treatment must be adapted to the individual case, according as the phlyctenular or interstitial type most predominates.

CHAPTER X.

INTERSTITIAL CORNEITIS.

Interstitial Keratitis, Parenchymatous, Diffuse, Syphilitic Corneitis or Keratitis.

INTERSTITIAL corneitis is a chronic interstitial inflammation of the cornea, and the patients in whom it occurs very frequently exhibit the well-known constitutional characteristics of inherited syphilis. It rarely occurs during very early childhood, or after twenty, and hardly ever during infancy, or after middle age. In a large majority of cases both eyes are affected, but one generally has the start of the other by a few weeks, and sometimes by as many months.

Symptoms.—A slight peri-corneal injection of one eye, with equally slight lachrymation and photophobia, generally precede by a day or two the first manifestations of the disease in the cornea. Here a slight cloudiness makes its appearance, generally near the centre (it has been compared to the effect produced by breathing on glass), which on close examination resolves itself into a number of minute dots of opacity interspersed in a general haziness. In time this steaminess of the cornea is replaced by a more opaque condition, and to this the term *ground-glass* cornea is applied; in this, as in the earlier stage, some parts of the cornea are more opaque than others.

The vascularity of the eye varies much in different patients; but besides the ciliary congestion which is found in all severe cases, we sometimes find a pink patch of variable size in the substance of the cornea (salmon-coloured patch of Hutchinson), which is believed by Mr. Hutchinson to invariably indicate that the disease has had a syphilitic origin. Photophobia and pain are present in most cases, but it is the exception to find either of these symptoms well marked. The loss of vision advances *pari passu* with the increasing opacity of the cornea; and, in like manner, as the cornea clears, the sight becomes restored.

Diagnosis.—In syphilitic cases, the constitutional features of syphilis, the steamy or ground-glass cornea, the fact that both eyes are affected, as is almost invariably the case, and the youth of the patient, point unerringly to the true nature of the disease.

In non-syphilitic cases, only one eye is, as a rule, affected; the patient is often no longer a child, and evidences of struma may or may not be forthcoming; the local appearances, however, are generally sufficient to ensure a right diagnosis.

Prognosis.—In most cases the cornea, even when it has become almost entirely opaque, clears to a considerable extent as time goes on, though it rarely regains its normal transparency. The amount of vision retained by the patient depends upon the extent to which the cornea has remained free from opacity; and even when it has been reduced to mere perception of light, a considerable amount of sight is often regained; whilst, on the other hand, but few cases end with normal vision.

The most frequent complication is *iritis,* which, by-the-by, may be very easily overlooked, owing to the opacity of the cornea. Inflammation of the ciliary body or of the choroid is occasionally met with, but there is hardly any tendency to ulceration or suppuration. As a rule, interstitial corneitis lasts from six to eighteen months; sometimes it is true the time is less than that mentioned, but sometimes it is even more.

Treatment.—Atropine (gr. j–ij ad ℥j aquæ) is almost always called for in the early stages of this disease, and sometimes in the later; it is of least use when the opacity of the cornea is most complete. Photophobia, when moderate in extent, should be treated by tinted glasses, eye-shades, &c.; but when severe a seton may be inserted in the temple, and in unusually severe cases it is even advisable to divide the outer canthus. In cases of unusual congestion and irritation, a few leeches should be applied to the temple, and iridectomy is sometimes resorted to in these cases.

In the later stages, when little or no irritation remains, the resulting opacity of the cornea is best treated by ung. hydrarg. ox. flav. (hyd. ox. flav. gr. iv–viii ad ℥j vaseline), or powdered calomel; and the former is so uniformly successful that it will seldom be necessary to have recourse to the latter. For further particulars respecting the treatment of corneal opacities, *see* chapter on Corneal Opacities, page 77.

It is important to remember that caustic and powerful astringents are *never* required in the treatment of interstitial corneitis, and may do grave mischief, especially if used in the earlier stages of the disease.

In most cases mercurials are indicated, either alone or in combination with a tonic; iron being the most generally useful under these circumstances. Whilst, however, mercurials in small doses are often administered with advantage for a considerable length of time, it often happens that they are badly tolerated, and can only be given, if at all, for a short time; this especially applies to those patients who are unusually anæmic, or otherwise below par. It is always advisable to combine a tonic with the mercurial when in any doubt how the latter will be borne. The best mercurial for children, as a rule, is hydrarg. c. cret. (gr. j aut ij semel aut bis die); for adults, perchloride of mercury (gr. $\frac{1}{16}$ bis terve die); vinum ferri for the former, and tinct. ferri perchlor. for the latter, are extremely serviceable, either when prescribed alone or combined with mercurials.

Iodide of potash has considerable repute in the treatment of this complaint, but most authorities place it at least second to mercury; it may be prescribed alone or in conjunction with a mercurial or tonic. Syr. ferri iodidi is often very useful, especially for children; as a rule, cod-liver oil should be given with it. After iron, quinine and bark are the most reliable tonics.

In treating interstitial corneitis we must remember that the disease is of an unusually obstinate and chronic character, and that whilst rapid improvement must not therefore be expected from any treatment, however judicious, the best results may naturally be expected from the persevering use of approved drugs.

CHAPTER XI.

SUPPURATIVE CORNEITIS.

Abscess of the Cornea, Onyx, Hypopyon.

IN suppurative corneitis the cornea develops a tendency to the formation of pus; the situation of the pus determining whether the case is one of abscess of the cornea, onyx, or hypopyon.

Abscess of the Cornea.

This affection is frequently met with in the aged, or in those who have been subjected to debilitating conditions, such as severe illness or want of food; and, above all, in those who, having been thus debilitated, receive some severe injury of the cornea, or undergo some operation involving that structure.

Symptoms.—In addition to a part, if not the whole, of the cornea becoming hazy, a small opaque spot, which is generally of a more or less yellow colour, is seen in the cornea (interstitial). If the disease advance, this extends, sometimes forming a circumscribed, yellowish mass, sometimes an undefined infiltration between the corneal layers. As a rule, there is much congestion of the conjunctiva and considerable lachrymation. There is often severe pain and well-marked photophobia, but in some cases there are scarcely any symptoms of irritation.

Diagnosis.—The appearance of the cornea is sufficiently characteristic to point out the true nature of the case.

Prognosis.—In the early stages resolution sometimes take place, but there are few cases in which the disease disappears and leaves no trace behind it, a leucoma of greater or less size almost always remaining, which, when near the centre of the cornea, results in a proportionate loss of sight.

Generally the abscess makes its way by ulceration, either anteriorly or posteriorly, in the former case an ordinary ulcer of the cornea being formed, in the latter case an hypopyon in the anterior chamber; the former is the more common result of the two.—Iritis is a not unfrequent complication.

Onyx.

The term onyx is applied to those cases of suppurative corneitis, or abscess of the cornea, where the pus gravitates between the corneal layers to the lower border of the cornea, and they are thus named because the pus in this situation presents an appearance strongly resembling the little white crescent at the base of the finger-nail. Almost all that has been written respecting abscess of the cornea, applies equally well to that particular form of it which is known as onyx.

Hypopyon.

Hypopyon is a term applied to the presence of pus or lympho-pus in the anterior chamber; as a rule, it is found more or less at the bottom of it, from the action of gravitation. Sometimes a mere trace is present; in other cases, the anterior chamber is more or less filled with pus; sometimes the lymph element enters largely into the composition of the purulent secretion; sometimes the latter consists of pus only, and in other cases more or less blood is mixed with it.

Hypopyon is not unfrequently caused by an abscess of the cornea making its way through the posterior layers of the cornea into the anterior chamber; or the same layers may secrete pus, under the influence of suppurative inflammation, without their being actually perforated. Hypopyon, moreover, may be directly due to inflammation of the iris, and only indirectly to the suppurative inflammation of the cornea which has produced the iritis; lastly, hypopyon may be due to iritis, irrespective of suppurative inflammation.

The connection between suppurative inflammation of the cornea and hypopyon is so often that of cause and effect, that there is no difficulty in understanding why their symptoms are so closely allied, the chief differences being due to the fact that in hypopyon the iris is almost always more or less affected, whilst it is only occasionally so when the abscess is confined to the cornea.

Diagnosis of Onyx and Hypopyon.—In many cases the crescent shape of onyx distinguishes it from the more or less flat surface of hypopyon, and a careful examination of the cornea in profile will often elicit the fact, that the collection of pus is well anterior to the iris, and that a clear extent of cornea separates the pus from the anterior chamber. When much lymph enters into the composition of a hypopyon, its surface is frequently far from level, and in such cases it does not alter its level when the patient changes his position; when it does so alter, we have a distinct proof not only of an hypopyon being present, but also of its being mainly, if not entirely, composed of pus. In most cases of hypopyon, the position of the secretion, in more or less immediate contact with the iris, and the fact that it evidently occupies the whole depth of the anterior chamber, materially assist the surgeon in arriving at a diagnosis.

Prognosis.—In all cases of hypopyon or onyx the prognosis should be a guarded one, as leucoma corneæ, anterior synechiæ, or posterior synechiæ, sometimes involving complete exclusion of the pupil, may any or all of them result from the disease; in many cases the sight being lost, and in not a few the eye being destroyed by panophthalmitis.

Treatment.—In almost all cases of suppurative inflammation of the cornea, abscess of the cornea, onyx, or hypopyon, warm or hot fomentations should be applied to the affected eye, the temperature being regulated by what is most agreeable to the patient's sensations; poppy or belladonna fomentations (ext. belladon. ʒj–ʒij ad Oj aquæ) are the most serviceable. The fomentation should be used several times a day, and in the intervals the eye should be covered with folded pieces of lint or rag, which have been saturated with the fomentation, and these should be kept in place by a compress bandage.*

In most cases it is advisable to use atropine (gr. ij–iv ad ℥j aquæ) two or three times a day, or even oftener; but it is imperative to do so if hypopyon is present, and above all if there is any iritis. Some authorities recommend eserine; if used at all it should be in those cases in which atropine seems least indicated—namely, where there seems to be no probability of iritis.

When the measures just recommended fail to arrest the suppurative action, and in all cases of hypopyon, the question of operative interference must at any rate be entertained. Either a paracentesis corneæ, Saemisch's operation, or an iridectomy may require to be performed; but want of space forbids our discussing the relative merits of these operations; besides, we have a strong conviction that the general practitioner will best consult his patient's interests and his own reputation, if in such serious cases he seeks the aid of a specialist.

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* *Use of the Compress Bandage.*—When an eye requires more than ordinary support, it must be covered with two doubled pieces of wet lint or old linen rag, or these may be wetted with belladonna, poppy fomentation, &c.; on them should be laid some cotton wool, the whole being kept in place by a narrow flannel bandage, 4 yards long by 1½ inches wide, which should be passed round the head, each turn alternately higher and lower. If only one eye requires support, the bandage must be applied diagonally, so as to leave one eye uncovered.

In the general treatment it is of the first importance to remember that the disease is essentially of an asthenic type in most cases, and therefore that a liberal diet, a moderate amount of stimulant, and tonics, should be prescribed. As a rule quinine (gr. j–ij) should be given two or three times a day; in some cases, however, iron or ammonia may be usefully substituted for it. Opium (gr. ½–1) should be given two or three times a day when the pain is severe; when there is much congestion, in addition to pain, a few leeches applied to the temple will sometimes give much temporary relief.

Amongst other remedies which are sometimes of service, is iodide of potash, which, in doses of 5–10 grains, combined with tinct. cinchon. co. ʒss–ʒj, may be given two or three times a day; this mixture sometimes proves very beneficial in cases of hypopyon. Blisters behind the ears, *ext. belladon.* ʒj, c. ung. hydrarg. ℥j, rubbed once or twice a day over the brow, and the hypodermic injection of morphia, are all occasionally useful.

It is generally advisable for the patient to take a certain amount of exercise in the open air, if the weather and his general condition admit of it, but the affected eye must be carefully protected whilst he is out-of-doors.

CHAPTER XII.

ULCERS OF THE CORNEA.

In all corneal ulcers there is a certain amount of excavation, involving one or more of the corneal layers; there are, however, many varieties of ulceration, for ulcers may be one or more in number; more or less superficial or deep; small or large; circular, crescentic, or irregular in outline; acute or chronic; transparent or opaque; vascular or non-vascular; marginal or central; primary or secondary to some other affection of the eye.

There are five principal varieties of corneal ulceration :—

1. *Transparent ulcer of the cornea.*
2. *Superficial opaque ulcer of the cornea.*
3. *Phlyctenular ulcer of the cornea.*
4. *Sloughing ulcer of the cornea.*
5. *Serpiginous or crescentic ulcer of the cornea.*

Most ulcers are preceded by and attended in the earlier stages with more or less infiltration of the adjoining cornea. When an ulcer begins to heal, as a rule, it becomes more vascular, the vessels disappearing when the reparative process is completed, but more or less opacity remaining to mark its site. For further particulars on this point, see chapter on Corneal Opacities.

Corneal ulcers are almost invariably attended by photophobia, which is sometimes very marked, and by more or less lachrymation, pain, and vascularity of the conjunctiva, besides a more or less well-marked zone of peri-corneal injection (*see* page 80); in some cases, however, these symptoms are entirely absent. Very generally ulceration is co-existent with an impaired state of the general health.

Transparent Ulcer of the Cornea.

This variety of ulcer may easily be overlooked unless the cornea be carefully scrutinized, for it consists of a minute excavation of the cornea, unaccompanied by either opacity or vascularity; it is, however, sometimes accompanied by considerable photophobia, lachrymation, and pain.

This variety of ulcer is essentially chronic in its character, and it not unfrequently leaves a minute facet behind it on the cornea, which is filled up very slowly, if at all.

Superficial Opaque Ulcer of the Cornea.

This variety of ulcer especially affects children; it may attack both eyes, though, as a rule, it only attacks one.

Symptoms.—In the early stage a small, more or less opaque, and more or less elevated spot is found on the cornea, generally near the centre, though it may be in any part of it. The small ulcer which results is attended by a varying amount of infiltration, which gradually disappears as the ulcer heals, but is replaced by an opacity which is not unfrequently permanent. Photophobia and pain are almost always present, but to a very variable extent.

Prognosis.—Speaking generally, this form of ulcer runs a somewhat short course, but this rule is by no means an invariable one; it sometimes recurs.

Phlyctenular Ulcer of the Cornea.

These little ulcers, which succeed the so-called phlyctenulæ of the cornea, are described under the head of phlyctenular corneitis (*see* page 46.)

Sloughing Ulcer of the Cornea.

As a rule this affection is not met with *until after* middle age, and it especially affects the aged and the feeble; the younger the patient, the more reason there is for suspecting the existence of some special debilitating cause. Not unfrequently the immediate cause is some contused or lacerated wound of the cornea, which, when accompanied by the conditions just mentioned, is extremely apt to result in a sloughing ulcer.

Symptoms.—The first symptom of this very serious affection is a localized infiltration of the cornea, generally of a greyish or whitish colour; this is soon succeeded throughout the greater part of the infiltration by a deep ragged ulcer of a more or less sloughy appearance, which often spreads rapidly, in some cases involving the greater part of the cornea, and in others going on to perforation. As a rule, the cornea, excepting the infiltrated part, presents a normal appearance. When the healing process begins, vessels are seen in the neighbourhood of the ulcer, and by degrees it is succeeded by a more or less dense leucoma.

The general symptoms of inflammation are less acute than would naturally be expected from the severity of the affection; for though conjunctival injection, lachrymation, pain, and photophobia are *generally* present, they are often less marked than in corneal ulceration of a much less serious character.

Diagnosis.—The irregular margin and sloughy appearance of the ulcer clearly distinguish this from other forms of ulceration.

Prognosis.—Even in favourable cases a leucoma inevitably succeeds the sloughing ulcer, which interferes with vision in exact proportion to its density, its extent, and its position with regard to the pupil. In less favourable cases the whole cornea may be more or less affected, and a staphyloma may be the result. In severe cases perforation of the cornea, with prolapse of iris, is sometimes met with, and hypopyon, or iritis, or both, may accompany the perforation, or be found independently of it. Any of these grave complications may lead to serious changes in the economy of the eye, even if they do not end in panophthalmitis.

Serpiginous or Crescentic Ulcer of the Cornea, Ring-shaped Ulcer, Chiselled Ulcer.

This very dangerous,but somewhat uncommon form of ulceration is hardly ever met with, save at or near the corneal margin ; old age and debility appear to be the chief predisposing causes ; as *a rule, only* one eye is affected.

Symptoms.—It usually appears as a narrow trench scooped out along the corneal margin, and exactly following its course; though it progresses slowly, it frequently ends in involving a considerable part of the corneal circumference, and occasionally the whole of it. As a rule it is more or less transparent. The attendant vascularity varies in amount, but there is almost always considerable lachrymation, photophobia, and pain.

Diagnosis.—The shape of the ulcer, and its position at the corneal margin, are peculiarities which it shares with no other form of corneal ulceration.

Prognosis.—The prognosis is always grave, for at best it will probably takes weeks to heal, and leave behind a dense leucoma. If the greater part of the corneal margin has become involved, considerable sloughing of the cornea may ensue, and in case of perforation, prolapse of iris may take place; hypopyon and iritis are also not unfrequent complications.

Treatment of Ulcers of the Cornea.

Treatment.—I propose first to speak of the rules which should guide us in our treatment of ulcers generally, and to enumerate the various remedies which are most useful in corneal ulceration, and then to mention what special treatment each variety of ulcer requires.

Local Treatment of Ulcers generally.—The chief points to bear in mind are :—

1. To ensure *rest* in any case for the affected eye, and so far as may be practicable for both eyes.
2. To *alleviate* the local pain and irritation, in the early stages especially.
3. To *stimulate* the ulcer, in some cases from the beginning, and in many others during the later stages.
4. To use *counter-irritation* when ordinary remedies have proved useless, and the ulceration threatens to become chronic.

The principal means at our disposal for resting the eye in corneal ulceration are bandaging, especially with the compress bandage, atropine, and in some cases eserine. As a rule, the greater the photophobia, the greater the benefit to be derived from the application of a bandage. Ordinarily, folded pieces of lint, or rag, dipped in water, belladonna lotion, or whatever other lotion may be deemed best, and secured by a single turn of a light bandage round the head, will suffice for the purpose, but in severer cases, especially when perforation is threatened, the compress bandage is to be preferred (*see* page 61).

In most cases of ulcer, atropine proves extremely useful; one or two drops of a solution from 1–4 grains to the ounce of water, should be dropped into the affected eye night and morning; the four-grain solution is as a rule the most useful.

It has not yet been determined beyond question in which cases eserine should be prescribed; for my part I prefer to use it for ulcers (not sloughing or crescentic) situated near the corneal margin (eseriæ sulph. gr. j–ij ad ℥j aquæ).

To alleviate the pain and irritation which so often accompany corneal ulceration, atropine, belladonna, the use of eye-shades or of tinted glasses, and in some cases hot fomentations, are most effectual. In the majority of cases atropine has most marked influence for good in lessening pain and irritation, but in some cases belladonna fomentation (ext. belladon. ʒj–ʒij ad Oj aquæ) can be advantageously used with or even substituted for it. In either case belladonna can be used both as an occasional fomentation, and also for saturating the lint with which the eye is to be tied up. In all cases of photophobia both eyes should be carefully shaded from the light, as far as practicable, by the use of coloured blinds, &c., indoors, and of eye-shades, tinted spectacles, goggles, &c., out of doors. In some cases, especially those of a suppurative type, hot fomentations, frequently applied, are of great service; belladonna fomentations are much used for this purpose; poppy fomentation is sometimes preferable.

The ulcers which most require stimulation are the superficial and the chronic, especially in their later stages. There are two local applications which answer admirably for this purpose, namely, the ung. hydrarg. ox. flav. (hyd. ox. flav. gr. iv–xvj ad ℥j vaseline) and calomel. A little of the ointment should be applied to the edges of the lids every night at bedtime. The calomel should be flicked into the eye from a feather or camel's-hair brush twice a week or oftener.

Counter-irritation proves effectual in proportion to the amount of photophobia present; it should only be used in a chronic case. A seton in the temple of the affected side is by far the most effective form of it; it should be worn for a considerable time—several weeks at least.

It is well to remember that caustics, and even strong astringents, are almost always contra-*indicated* in the treatment of corneal ulcers, *especially in* the earlier stages; lead lotions also should never be prescribed, lest lead should be deposited in the cornea.

Constitutional Treatment of Ulcers generally.—Since ulcers of the cornea are hardly ever met with save in those whose health is below par, the improvement of the general condition is of the first importance. Good food and plenty of it; good hygienic conditions; and tonics, of which iron is one of the best, are almost essential to recovery—at any rate to rapid recovery. For children, vin. ferri and ol. morrhuæ are excellent remedies, especially when given together. For adults, iron in some form or other, quinine, or gentian are most suitable.

Treatment of Transparent Ulcer of the Cornea, and Superficial Opaque Ulcer of the Cornea.—The treatment of these two forms of ulceration is pretty much identical, and I have but little to add respecting it to what I have already stated to be the most suitable treatment for ulcers generally. In children, in whom the photophobia is sometimes so extreme that it is almost impossible to examine their eyes satisfactorily, the use of a cold douche will sometimes materially facilitate the examination, besides conferring considerable benefit upon the eyes. In children, especial attention should be paid to the state of the bowels, and in some cases hydrarg. c. cret., or other alteratives should be prescribed, either alone or in conjunction with tonics, as may be deemed best.

Treatment of Sloughing and Crescentic Ulcers.—In ordinary cases the treatment must be the same as for ulcers generally, remembering, however, the especial importance in these cases of supporting the patient's strength by food, stimulants, and tonics; of the latter, quinine is one of the best. When the case is complicated with iritis or hypopyon, iodide of potash with bark will often prove of service. Hot fomentations and a pressure bandage are amongst the most useful remedies. When there is much pain, opium must be prescribed, at any rate at bedtime.

If none of these remedies produce any perceptible effect; if the ulcer continue to increase in size, or, becoming deeper, to threaten perforation; if an hypopyon is formed; or, lastly, if the tension of the eye become decidedly increased, the question of an operation must at any rate be entertained. In case an operation is determined upon, an iridectomy, a paracentesis corneæ, or a Saemisch, will probably have to be performed; but the general practitioner will act wisely in leaving a specialist to decide which of these operations the exigencies of a particular case demand.

Anomalous Forms of Corneal Inflammation.

Besides those cases which belong to one or other of the four well-defined types of corneal inflammation, namely, the phlyctenular, the interstitial, the suppurative, and the ulcerative, others are not unfrequently met with which cannot be accurately classed under either of these heads, but which, nevertheless, exhibit some of the characteristics of one or more of them. Their treatment must be more or less identical with that of the particular type or types of inflammation to which they most nearly approximate.

CHAPTER XIII.

OPACITIES OF THE CORNEA.

Nebula, Leucoma, Lead Opacity.

THE two most common forms of corneal opacity are known respectively as nebula and leucoma. The former term is applied to an ill-defined cloudiness or mistiness of the cornea, the latter to a more or less well-defined white opacity. Either may affect the whole cornea or only part of it; in the great majority of cases a part only is affected, especially in the case of nebulæ. A nebula and a leucoma may frequently be met with in the same cornea, and still oftener a leucoma is found to shade off at its margin into a nebula; sometimes, however, the margin of the leucoma is well defined.

Whenever any vascularity is found associated with a nebula or a leucoma, it must be attributed to the inflammatory process, which has caused the opacity in question, being still in operation. The same remark applies to pain and irritation, which are never met with after the inflammation *has completely* subsided.

Vision is interfered with in direct proportion to the extent, position, and density of the opacity; the loss of vision being directly commensurate with the density of the opacity and the extent to which it covers the pupil. Even a very faint nebula will interfere appreciably with vision if situated immediately in front of the pupil.

Nebulæ and leucomata may be met with in one or both eyes, and at any age, as might be expected considering that they may be the result either of ulceration of the cornea, corneitis, or corneal injury; the more superficial the ulcer or the corneitis, the more faint the nebula; the more deeply the tissues are involved, the more opaque and dense the leucoma. Nebulæ, if not searched for, may easily be overlooked; a leucoma cannot be overlooked, and can only be mistaken for an opacity from lead, from which, however, it differs considerably (*see* page 78).

Prognosis.—The extent to which an opacity will disappear depends mainly upon whether it is a nebula or a leucoma, or to which of these forms of opacity it most nearly approximates. Speaking generally, nebulæ disappear more or less in the course of time, whilst leucomata are permanent. Age is an important factor in this question, for opacities will almost, if not quite, disappear in childhood and youth, which would certainly be more or less permanent in after-life. Duration of time has a most material influence upon corneal opacities, the tendency of all save very dense leucomata being to alter for the better as time elapses. In not a few cases the iris is adherent to the cornea immediately posterior to the opacity (anterior synechia); but as the only remedy for this is an operation, we need not discuss the question further in these pages.

Treatment.—Suitable treatment has a decided influence for good upon corneal opacities; it should be mainly directed towards stimulating, in a sufficient but not excessive degree, any opacity which is more or less nebulous in its character. The two best applications for this purpose are the ung. hyd. ox. flav. and calomel. The ointment (hydrarg. ox. flav. gr. iv–xvj ad ℥j vaseline) should be applied to the edges of the lids once or twice a day; and it is well to bear in mind that the more recent the opacity, the more gently it should be dealt with. If calomel is used in preference to the yellow oxide, it should be flicked on to the opacity with a camel's-hair brush, or feather, daily or less often. Amongst other local applications used for the same purpose are, ung. hydrarg. ox. rubri, and solutions of the following salts :—Iodide of potash, sulphate of zinc, sulphate of copper, perchloride of mercury, nitrate of silver, and sulphate of soda.

The treatment of a leucoma, which from its situation materially interferes with vision, resolves itself into an attempt to remedy, as far as possible, the defective vision by optical appliances or by operation ; in neither case coming under our consideration here; the same remark applies to tattooing the cornea in the case of a leucoma, for the purpose of improving the patient's appearance.

Lead Opacity.

When a lead lotion is used in a case of ulceration of the cornea, some lead salts are generally deposited in the ulcerated surface, forming a glaring white opacity, which is very different from the less-defined and less conspicuous leucomatous opacity. The deposited lead can be removed by scraping with a sharp scalpel; and when the irritation thus caused has subsided, the remaining opacity of the cornea must be treated in the ordinary way.

CHAPTER XIV.

IRITIS.

THERE are several varieties of iritis, but it will best subserve my purpose to describe first iritis generally, mentioning afterwards in what particulars the several varieties differ from each other. Iritis (inflammation of the iris) is often due to a constitutional cause, generally either syphilis or rheumatism, but occasionally gout. It may, however, be caused by cold, night-work, and other depressing conditions, especially when any of these are met with in combination with syphilis or rheumatism. It may be of traumatic origin, and will sometimes follow almost any kind of injury of the eye; it is also somewhat common after cataract extraction. It may be secondary to some other ophthalmic disease, *e.g.*, corneitis, corneal ulcer, choroiditis; or, on the other hand, iritis may set up inflammation in some neighbouring tissue, as in cases of irido-cyclitis, irido-choroiditis, &c.; it also plays a very important part in that extremely grave affection—sympathetic *ophthalmia.*

Iritis may occur at any age, but it is generally a disease of adult life; it may affect one or both eyes; in rheumatic cases, however, only one eye is usually affected, but in syphilitic cases both; there are many exceptions to each rule.

Symptoms.—The vascularity differs considerably both in extent and degree, but in all except slight cases there is a more or less well-defined pink or red zone of parallel vessels radiating from the cornea. The iris presents a dull, muddy appearance, and it not unfrequently looks greenish. In some cases lymph is seen effused on the surface of the iris, and in syphilitic cases it is found there in the form of minute nodules. The pupil is somewhat smaller than the other, if only one eye is affected, and either contracts sluggishly or not at all. After atropine has been used, it either remains unaltered or becomes more or less irregular in shape, owing to the whole or part of the pupillary edge being adherent to the anterior capsule of the lens. In neglected or wrongly treated cases, the whole pupillary area may be found blocked by an exudation of lymph. The aqueous is frequently somewhat turbid, and sometimes a layer of pus (hypopyon) is found at the bottom of the anterior chamber.

Lachrymation and photophobia are not as a rule well-marked symptoms; pain varies much, both in amount and situation, for it may be very severe, or but slight; and again it may be confined to the eyeball, or extend to the neighbouring parts; it is generally more or less intermittent. Vision is always impaired; tension is generally somewhat increased, and in what is called *serous iritis* sometimes to a very considerable extent.

Diagnosis.—The abnormal appearance of the iris and pupil, especially of the latter after atropine; the pink zone of parallel, radiating vessels round the cornea, and the diminution of vision, render the diagnosis of iritis an easy matter in the great majority of cases.

Prognosis.—Few ophthalmic diseases can be guided to a satisfactory termination with more certainty than iritis, if early recognized and rightly treated; but if overlooked for a time or wrongly treated, defective sight, or even total blindness, is frequently the result. As a rule, the less the mobility of the pupil has been interfered with by the disease, the more favourable is the prognosis. Of course any such complication as hypopyon or cyclitis seriously increases the danger. Syphilitic iritis sometimes recurs, but the rheumatic variety almost always does so.

Syphilitic Iritis.

Syphilitic iritis is especially prone to form lymph, and when this assumes the form of one or more reddish-yellow nodules on the surface of the iris, the specific nature of the complaint is believed to be established beyond doubt. Syphilitic iritis is almost invariably attended with the symptoms of secondary syphilis ; as a rule both eyes are affected.

Rheumatic Iritis.

In rheumatic iritis there are none of the constitutional symptoms of syphilis, and there is much less tendency to the exudation of lymph than in the syphilitic variety ; it generally affects only one eye at a time, though it is very apt to affect both sooner or later.

Suppurative Iritis.

In suppurative iritis there is a tendency to form pus rather than lymph, and hypopyon not unfrequently accompanies it.

Serous Iritis (Keratitis punctata).

In serous iritis there is no tendency to deposit lymph on the iris ; the aqueous becomes very turbid and abundant, the tension is frequently much increased, and the disease is generally associated with small dotted opacities on the posterior surface of the cornea.

Treatment of Iritis.—In the treatment of iritis, all remedies sink *into comparative insignificance when compared with atropine;* for whilst many cases can be cured when this drug only is used, almost every case without exception would end disastrously unless this or some other mydriatic was prescribed.

Not only would I recommend the use of atropine in iritis as a matter of course, but that it should be used freely. In an ordinary case one or two drops of a strong solution (atrop. sulph. gr. iv ad ℥j aquæ) should be dropped into the eye, at first not less often than from 3–6 times a-day; and sometimes it is well to repeat the application on each occasion at the end of a few minutes. As soon as the pupil has become fully dilated, the solution can be used less frequently, say only 2 or 3 times a-day, but it is well to continue using a solution of atropine (gr. j–ij ad ℥j) for some time after all inflammatory symptoms have subsided. If the pupillary edge is bound down by strong and numerous adhesions *(a fact* sufficiently evidenced by its slight *mobility* under the influence of a strong solution of atropine, repeatedly applied), it is advisable to use atropine with more caution, lest dangerous irritation be produced by unavailing efforts to break through the adhesions; nevertheless, even in these cases atropine should be fairly tried.

In some cases, where atropine has produced no material effect upon the pupil, and especially if the inflammation run high, and there is more than ordinary pain, four or five leeches should be applied to the brow and temple, since afterwards the pain is often lessened, and the action of the atropine sensibly increased.

Sometimes atropine produces considerable irritation of the conjunctiva and lids, evidenced by the vascularity of the conjunctiva, and œdema and swelling of the lower lid and upper part of cheek. In such cases the atropine must be discontinued, at any rate for a time, and a solution of duboisine or daturine used in its place: when the irritation has subsided, the atropine can be used mixed with vaseline instead of being dissolved in water, or else one of the other mydriatics can be continued.

Hot belladonna (ext. belladon. ʒ–ʒij ad Oj aquæ) or poppy fomentations are required in almost all cases of suppurative iritis, in the other varieties of iritis, when attended with unusual pain, and in all except severe cases of atropism. In the two first-mentioned conditions they should be used in conjunction with atropine. In obstinate and severe attacks of iritis, a blister behind the ear will sometimes prove of benefit.

If the disease obstinately resist all the usual remedies; if the pupil is nearly, and, *à fortiori*, if it is completely closed; if the tension is decidedly increased; if the aqueous remain turbid for some days, or if hypopyon form, the question of either an iridectomy, or a paracentesis must be entertained. In all cases of iritis, reading, writing, &c., must be strictly forbidden, and a shade should be worn over *both* eyes whenever the patient is not in a well-darkened room.

In all cases of iritis where lymph has been effused, mercury should be prescribed; but it is imperative to give it when the syphilitic origin of the affection is undoubted. It can be given alone, or in conjunction with a small dose of opium, or it can be used as an inunction in the axilla, or on the inner side of the arm or thigh. It is best to give it at first in sufficient doses to produce slight salivation within forty-eight hours, and then to administer it in just sufficient quantity to keep up *the effect* on the gums. When mercury has been given for some time, quinine may often be added to it with much benefit, and when there is much debility should be given with it from the beginning. In cases where even slight salivation is contra-indicated, the ung. hydrarg. c. belladon. (ext. belladon. ʒj, c. ung. hydrarg. ℥j) may be rubbed into the brow once a day.

In cases of rheumatic or gouty origin, mercury should not be prescribed unless other remedies fail, and the disease threatens to become chronic. In most cases where mercury is given, iodide of potash can be given in place of it after a time; and in rheumatic, gouty, or suppurative iritis, it can be given from the beginning (3–10 grain doses); in suppurative iritis in conjunction with quinine or bark, and in rheumatic and gouty cases with bicarbonate of potash, colchicum, &c.

After a course of either mercury or iodide of potash, it is well to give a tonic—quinine, bark, and iron being the best. When the pain is at all severe, opium should be given, at any rate once a day (at bedtime); in rheumatic cases, Dover's powder is a convenient form of administering it, but in many cases most benefit is derived from the subcutaneous injection of morphia. Amongst other drugs which have been recommended in the treatment of iritis are, turpentine, aconite, and *guaiacum*.

CHAPTER XV.

CATARACT.

IN the majority of cases the existence of cataract, even in an incipient stage, can be detected by dilating the pupil with atropine, and half an hour afterwards examining it by the oblique illumination (how to do this see page 8). When the whole lens is opaque, the nature of the case is obvious; but, as a rule, a merely localized opacity, dots, lines, striæ, streaks, or patches, of a grey or white colour, seen in the pupillary space behind the plane of the iris, indicate the presence of cataract. Care must, however, be taken not to confound with any of these appearances the dark spots on the anterior capsule, which are the result of uvea deposited on it in a previous attack of iritis; in the latter case, however, other evidences of the eye having suffered from iritis are generally forthcoming.

In elderly people the appearance of a healthy lens is sometimes so suggestive of cataract, especially to an unpractised eye, that unless opaque striæ or patches are seen, it is wiser to withhold a diagnosis.

The treatment of cataract does not come within the scope of this work, but I take this opportunity of advising the general practitioner, in every case of supposed cataract, however incipient, to send the patient *at once* to a specialist. This is advisable, in the first place, because it is only when the cataract is immature that the vitreous, retina, &c., can be examined, and the knowledge of their condition is of great importance in the prognosis and treatment of the case; and, in the second place, because the cataract may, unknown to the general practitioner, be complicated with some other disease of the eye, which requires immediate treatment. In some cases, moreover, cataract may not really be present at all, but some other affection of the eye may have been mistaken for it.

CHAPTER XVI.

GLAUCOMA.

THERE are four principal varieties of this very important disease :—

1. *Acute Glaucoma* (acute inflammatory glaucoma).
2. *Sub-acute Glaucoma* (chronic inflammatory glaucoma, or chronic glaucoma).
3. *Chronic Glaucoma* (simple glaucoma).
4. *Secondary Glaucoma* (consecutive glaucoma).

The acute and chronic varieties differ from each other in many important particulars; the sub-acute differs from both, though it shares many of the characteristics of each. The secondary, unlike the other three forms, is directly due to some injury or disease of the eye. *The* pathognomonic symptom of all forms of glaucoma is hardness or increased tension of the eyeball. Glaucoma almost always attacks both eyes, but rarely at the same time; the interval may extend over a few weeks, or as many years. Those who are attacked by this disease are usually over fifty, and it is comparatively seldom met with in persons under forty, except as a secondary affection; it is believed that women are more subject to it than men.

The following are some of the predisposing and exciting causes which have been mentioned in connection with idiopathic glaucoma—gout, rheumatism, neuralgia, overwork, want of sleep, grief or any other mental shock, the use of atropine in a predisposed eye, iridectomy performed on the fellow-eye for glaucoma, and presbyopia not duly corrected by glasses.

Secondary Glaucoma may complicate any disease or injury of the eye, but it is especially prone to occur in cases of dislocated lens, traumatic cataract, perforating ulcer of cornea with anterior synechia, perforating wound of eyeball, and intra-ocular tumour, especially where two or more of these conditions are present in the same eye.

Acute Glaucoma.

An attack of acute glaucoma may occur in the course of sub-acute or even chronic glaucoma, or it may supervene after certain premonitory symptoms; or, on the other hand, it may suddenly *develop itself* without the slightest warning, though this is quite the exception. The most important premonitory symptoms are:

Rapid increase of presbyopia, necessitating the use of stronger glasses at unusually short intervals of time.

The appearance of coloured rings or halos round the light of candles, lamps, &c.

The appearance of a mist before the affected eye, which passes off after a time, leaving the sight as clear as ever.

An increase of tension in the affected eyeball, which, however, is not well marked at this stage.

Ciliary neuralgia, sluggishness of the pupil, and contraction of the field of vision, are also occasionally noticed.

The premonitory symptoms recur from time to time, the intervals being marked by a complete cessation of all the symptoms; these intervals generally become shorter and shorter as time elapses.

When an attack has actually come, we always find injection, and somtimes extreme injection, of both conjunctival and sub-conjunctival vessels, and occasionally there is chemosis and swelling of the lids. Sometimes there is lachrymation and a little conjunctival discharge, but the latter is always very limited in quantity. The cornea becomes steamy, the pupil is dilated, and generally ceases to be contráctile; the anterior chamber becomes more and more shallow, and the eye increasingly muddy in appearance. The tension is always much increased, and in many cases the eyeball feels almost as hard as a marble; the cornea becomes more or less insensible, and does not resent the touch of a feather or other light object.

The pain is generally very severe, sometimes amounting to agony; it is referred not only to the eye, and the parts round it, but also in many cases to the back of the head. The general health suffers severely, and nausea or sickness is very generally present. Vision is rapidly diminished, and in severe cases soon becomes reduced to mere perception of light; and, even this is often lost if the attack continue unrelieved. In less severe cases, where an examination of the field of vision is possible, it will be found to be considerably contracted, especially on the nasal side. Photophobia, flashes of light, and halos round lights are also sometimes noticeable symptoms.

Sub-Acute Glaucoma.

The sub-acute variety of glaucoma is generally more insidious in its approach than the acute, and the premonitory symptoms are said as a rule, to extend over a longer period of time. They are much the same in other respects, though if anything less pronounced than in the acute form of the disease. When the disease has fairly set in, it is characterized by a gradual increase of tension, and consequent deterioration of the eye; but this is varied from time to time by inflammatory attacks, similar in kind to those of acute glaucoma, but differing materially from them in degree; each of them, however, leaving the eye rather worse than it found it, both as respects the hardness of the globe and the amount of vision possessed by the patient. In point of fact, the various symptoms which have been described as characterizing acute glaucoma, are all met with in the sub-acute variety, but in a less aggravated form.

Chronic Glaucoma.

Chronic Glaucoma creeps on so insidiously that often its presence is not detected until the disease is well advanced. It can hardly be said to have a premonitory stage, since the disease has actually begun as soon as the earliest symptoms are recognized. It differs from both the acuter varieties in that it is not accompanied by either inflammatory attacks or pain. In some cases the dimness of sight, the rings round the light of a candle, and other symptoms characteristic of glaucoma, are especially noticed at certain times, but in other cases the disease pursues its course slowly and unvaryingly to its termination.

Secondary Glaucoma.

This differs from the other varieties in being caused by some other affection of the eye, and it is well to bear in mind that its symptoms may be, to some extent, disguised by those of the disease which has given rise to it.

Glaucoma.

Diagnosis.—Glaucoma has been mistaken for cataract, for a bilious attack, and for an acute ophthalmia, besides other affections; these mistakes would have been avoided if due attention had been paid to the following symptoms, some of which are present in every case of glaucoma; Increase of tension; sluggish, if not dilated, *pupil; contracted field of vision, especially on* nasal side; rings or halos round lights; gradually increasing dimness of sight; occasional attacks of increased dimness; pain in and around the eyeball (in the acute and sub-acute forms only); vascularity of the eye (in the acute and sub-acute forms only), and changes in the fundus, which can be detected only by the ophthalmoscope, but which are amongst the most valuable diagnostic evidences of glaucoma.

Prognosis.—A single attack of acute glaucoma, if left to Nature, or wrongly treated, will generally either destroy all vision in the affected eye, or, at any rate, seriously damage it, and in the latter event, it is almost always followed, sooner or later, by other attacks which complete the work of destruction. In sub-acute and chronic cases the same result is reached, only more slowly; in the latter form of the disease an eye may become quite blind without its owner being aware of the fact.

The prognosis in glaucoma is very materially improved if a suitable operation (Iridectomy or Sclerotomy) be performed. In almost all cases of acute glaucoma, an early operation will prove of immense benefit; the longer it is delayed the less beneficial will it prove. The more chronic e case, the less the benefit that is to be hoped for from operation, though, even in all but extremely chronic cases, some decided benefit may reasonably be expected, especially if the operation has been performed at an early stage of the disease. In relation to this subject, see remarks on treatment of glaucoma. The prognosis in secondary glaucoma should always be a guarded one. Cataract is no uncommon complication of chronic glaucoma. An eye in which sight has been completely destroyed by glaucoma, not unfrequently atrophies after a time.

Treatment.—Although, as will be mentioned hereafter, the use of eserine and other remedies sometimes proves of some service in the treatment of glaucoma, nevertherless the only remedy worthy of the name of *curative* is an operation.

It is extremely important to bear in mind that in acute glaucoma, especially of a severe type, an operation (Iridectomy or Sclerotomy) should be performed within as few *hours* as possible after the outbreak of the attack, since the amount of vision restored by the operation, is in an inverse ratio to the time which has elapsed since the attack began.

In sub-acute and chronic glaucoma time is by *no means of* such importance, though the results to be expected, and the time which has elapsed since the glaucomatous state fairly set in, bear the same ratio to each other as in the acute variety. In some chronic cases, especially in the later stages, no benefit is derived from an operation; but it must not be forgotten that in such cases an operation is the only remedy which offers any hope of benefit. If increase of tension and other glaucomatous symptoms recur after an operation, recourse should generally be had to it a second time.

In cases where the question of operative interference is not imperative, or where circumstances necessitate its temporary postponement, one or two drops of a solution of eserine (eseriæ sulph. gr. i–ij ad ℥j aquæ) should be dropped into the affected eye, twice, thrice, or oftener in the twenty-four hours. Though eserine has occasionally seemed to give decided relief, it should never be regarded as a substitute for an operation, but as almost the only therapeutic remedy which has even the slightest influence on the glaucomatous condition. When in acute glaucoma an operation is of necessity postponed, it may be worth while to apply leeches to the temple, and to administer a full dose of chloral hydrate or *opium, or to* use morphia hypodermically.

CHAPTER XVII.

SYMPATHETIC IRRITATION AND SYMPATHETIC OPHTHALMIA.

INJURY or disease of one eye will sometimes set on foot sympathetic irritation or sympathetic inflammation in the other; but the two conditions, though arising from similar causes, differ widely in most particulars, the former producing functional disturbance only, whilst the latter is invariably attended with organic changes. It is doubtful whether the two are essentially different in their nature, so that the one never leads to the other, or whether sympathetic irritation is not in some cases the precursor of sympathetic ophthalmia.

SYMPATHETIC IRRITATION.

The *exciting* eye generally affords the usual evidence of inflammatory changes, namely, congestion, lachrymation, pain, and photophobia; but in some cases none of these symptoms are well marked.

The *sympathizing* eye is generally very little, if *at all, congested*; but it becomes pinkish on very slight provocation, and readily lachrymates. Photophobia is almost always present, though rarely so marked as in corneal diseases. The accommodative power is generally much lessened, and the eyes, after being used in reading, writing, &c., for a few minutes, become so weak that they have to be rested for a time. Sympathetic irritation sometimes lasts for a considerable time, and may recur if the exciting cause again become active; whether it ever directly leads to sympathetic ophthalmia is doubtful ; but nevertheless, in all cases of sympathetic irritation, the question of enucleating the exciting eye, is one which should be duly weighed without unnecessary delay, and becomes urgent unless the symptoms speedily subside. (In relation to this subject see treatment of sympathetic ophthalmia.)

SYMPATHETIC OPHTHALMIA.

Sympathetic Inflammation, Sympathetic Ophthalmitis, Sympathetic Irido-Cyclitis.

Sympathetic ophthalmia differs from every other inflammation of the eye, in that it is produced in one eye by some morbid condition of the other, this condition being very generally one which the ciliary region has been injured, or *ciliary* body dragged upon. It consists of an adhesive or plastic inflammation, accompanied with free exudation of lymph. It especially affects the iris and choroid; but, in its course, frequently implicates the whole eye. It is extremely insidious in its approach, but generally occurs within a few weeks, and sometimes within a few days, of the original injury, though not unfrequently after many months or even years have elapsed; it is probable that no lapse of time renders an eye safe from an attack of sympathetic ophthalmia, especially when the injured eye contains a foreign body. It may occur at any age, but is more frequently met with in childhood than adult life.

Almost any severe injury to, or operation performed on, one eye may be followed by sympathetic ophthalmia in the other, but it is especially prone to ensue in the following cases:—

1. Wounds of the eyeball in the ciliary region.
2. Wounds of the cornea near the periphery, where the iris is caught in the wound, especially if complicated with traumatic cataract.
3. Shrunken eyeballs, especially those with bone developed in them.
4. Eyes containing a foreign body.

Symptoms.—A slight injection of the ocular conjunctiva, which becomes more pronounced if the patient's eyes are used for near objects, and an inability to see the latter clearly, at any rate for more than a minute or two at a time, are amongst the earliest symptoms which herald the approach of this insidious and destructive disease.

As the disease advances the vascularity becomes more marked, and is identical with that present in a severe case of iritis; the iris undergoes similar changes (*see* page 80), and is even more altered in colour, assuming a dirty-yellow appearance, the pupil becoming fastened down by synechiæ with surprising rapidity. One symptom is almost always, if not invariably, present, I refer to minute dotted opacities in the posterior layers of the cornea.

It is important to bear in mind that tenderness in the ciliary region, as evidenced by the patient flinching when gentle pressure is made through the lid with a finger, is a symptom which, in an injured eye, specially points to the danger of sympathetic inflammation occurring in its fellow-eye. This local tenderness is also frequently *noticed* in an eye which has become sympa*thetically* inflamed.

Pain is often slight, or even altogether absent, in the earlier stages of sympathetic ophthalmia, but it is frequently severe when the disease is fully developed; neuralgic pains in the neighbourhood of the eye are also not uncommon. Photophobia is almost always present, but seldom in a marked degree. The tension varies not only in individual cases, but also with successive stages of the same case; as a rule it is more or less, sometimes considerably, increased in the earlier stages, and diminished to a like extent in the later ones.

Prognosis.—The prognosis is very grave, for almost all eyes are more or less seriously damaged, and most become atrophied. To add to the terrors of this disease, not only does it linger on month after month, but it is also very apt to recur from time to time.

Preventive Measures.—As sympathetic ophthalmia is a disease which responds but little to treatment, and too often runs its course unchecked to the goal of total blindness, it is of extreme importance to adopt such measures as may prevent its occurrence. Here let me impress upon the reader, that though it is highly desirable to keep the patient in a darkened room, to use *atropine* and other soothing remedies; yet that all these measures put together are of nothing like the same importance as the removal of the injured eye; for whilst the presence of the injured eye will often bring about sympathetic inflammation, however carefully we resort to preventive measures, the enucleation of the injured eye will invariably avert the dreaded disease, if we only operate sufficiently early.

It is true that sympathetic ophthalmia has apparently been set on foot *after* the removal of the injured eye, but it is highly probable that in these cases the disease has been originated previous to the enucleation, though no evidence of its existence had been then forthcoming.

Whenever, therefore, the sight of the injured eye is irretrievably lost, and the injury is of such a character as to render sympathetic ophthalmia not improbable, the sooner enucleation is resorted to the better. If, however, the injured eye retain some sight, even though it be but little, or if the injury be one which is not often followed by sympathetic inflammation, the question of enucleation becomes much more difficult, and can only be decided after a most careful consideration of all the factors of the case. The difficulty, of course, is greatest of all when the injured eye *retains good* sight.

Treatment of the Sympathizing Eye.—Persistent and absolute rest of the eyes is of great importance in the treatment of this intractable disease. To ensure this, the patient should live in darkened rooms, and when he takes exercise out of doors his eyes should be carefully bandaged. On these occasions his eyes may with advantage be covered with pieces of lint or soft linen rag, dipped in belladonna lotion (ext. belladon. ʒj–ʒij ad Oj aquæ): this lotion can also be occasionally used as a fomentation. Sometimes poppy fomentation will prove more beneficial than belladonna; atropine (atrop. sulph. gr. ij–iv ad ℥j aquæ) should always be used, as a rule two or three times a day. In any case which resists the usual remedies, it is advisable to try the effect of a seton in the temple.

When the patient is not in poor health, mercury should always be administered by inunction or otherwise, since this drug seems sometimes to do much good. If the patient is weak and debilitated, quinine or iron, with cod-liver oil, will prove of most service, and one of the two former should always be used *after* a mercurial course. As a perforced stay in a darkened room is very depressing, it is advisable to order a generous diet, with stimulants at *discretion.*

CHAPTER XVIII.

TINEA, STYE, TARSAL CYST, ENTROPION, ECTROPION, TRICHIASIS, DISTICHIASIS.

TINEA.

Tinea Tarsi, Ophthalmia Tarsi, Sycosis Tarsi, Blepharitis, Blepharitis Marginalis, Blepharitis Ciliaris, Lippitudo.

TINEA is a chronic inflammation of the margins of the lids, of an ulcerative type, and especially affecting the follicles of the eyelashes. Generally all four lids are more or less affected, but sometimes only one; the upper lids are almost always worse than the lower. It is most common amongst children, especially those of the poor, and above all those of a scrofulous diathesis; it is often met with after the various exanthemata, especially after measles; it very rarely indeed originates in adult life.

Symptoms.—In a slight case nothing but a few diminutive scales can be seen at the roots of the lashes.

In a more severe case scabs of a dirty yellow colour, and of considerable size, are seen scattered along the edge of the lid, or the margin may be more or less thickly crusted with them. If they be removed, small excoriations, and frequently small pustules, will be discovered. The lashes are distorted in position, and matted together in small bundles.

In really severe cases the margin of the lid is thickened and vascular, bleeding readily, and presenting a peculiar raw appearance; not unfrequently it is somewhat everted, and there is some epiphora: only a few stunted lashes are to be seen. The lids feel stiff and uncomfortable, and an itching or pricking sensation is often felt, rarely, however, amounting to actual pain.

Diagnosis.—The restriction of the disease (as a rule) to the lid-margin, the crusts, and the implication of the lashes, make a correct diagnosis an easy matter.

Prognosis.—Slight cases are easily cured, sometimes in a few days; chronic cases are very troublesome to deal with, and are very apt to recur. In severe chronic cases one can scarcely hope to do more than benefit the patient to some extent. Amongst the effects produced by the disease in a more severe form, are, eversion of the lid-margins, displacement of puncta, epiphora, and partial, or even total, destruction of the eyelashes. Sometimes, indeed, tinea leads to conjunctival and corneal affections, and may thus do serious mischief.

Treatment.—The first step in the treatment of tinea is the removal of all the scabs and exudation matter; this is best done by free soaking and washing with tepid or warm water; then, and not till then, should the lotion or ointment prescribed be applied. The cleansing process should be repeated as often as the exudation reappears; if the encrustation is very adherent, its removal is facilitated by washing the lids with a warm solution of carbonate of soda (gr. v–x ad ℥j aquæ).

After the crusts have been removed, the edges of the lids should be bathed with an alum lotion (gr. ij ad ℥j aquæ), and this should be repeated as often as the crusts are removed. At bedtime a little mitigated nitrate of mercury ointment (ung. hydrarg. nitrat. 1–8 or 12 vaseline) should be smeared along the edges of the lids, and if the exudation be free this may be repeated in the morning. If the lids do not quickly improve, the alum wash may be doubled in strength, or it may be combined with sulphate of zinc (gr. i–ij ad ℥j aquæ); and the ung. hydrarg. oxidi rubri, or *the ung. hydrarg.* ox. flav. (in each case gr. iv–xvj ad ℥j vaseline), may be substituted for the nitrate of mercury ointment.

In severe cases it is sometimes necessary to have recourse to stronger measures, and the nitrate of silver, in solution, or in stick mixed with nitrate of potash, will be found useful. A solution of nitrate of silver (gr. v–x ad ℥j aquæ) may be painted along the excoriated lid margin, every or every other day; or a stronger solution (gr. x–xxx ad ℥j aquæ) may be used similarly once or twice a week. As a rule the mitigated stick is much the best application for the purpose; it should not be used more than twice a week. A borax or borax and glycerine lotion will sometimes prove useful.

In chronic cases of a severe character it is a good plan to pull out with a pair of cilia-forceps all lashes which are either stunted in size or distorted in position, and this may be repeated from time to time. When the lashes are neither stunted nor distorted, but are the seat of much encrustation, it is sometimes advisable to cut them off close to the lids. In chronic cases, where there is epiphora dependent upon eversion of the lid and consequent malposition of the punctum, it is advisable to slit up the canaliculus, and to *keep it* permanently open.

In most cases, some form of iron with cod-liver oil proves of considerable service; vinum ferri is an excellent remedy for young children. In obstinate cases, especially after childhood, arsenic may sometimes be advantageously prescribed.

STYE.

Hordeolum, Hordeolus.

A stye is a small boil, which may be found on either of the lids, but always near the margin. It is seldom met with, save in children and young people whose health is below par. In most cases only one stye is present at a time, but it is very apt to recur several times.

Symptoms.—A small inflamed swelling near the edge of the lid, and generally in close apposition to an eyelash; it is not unfrequently attended with considerable swelling of the whole lid. It generally suppurates and runs a similar course to any other boil, subsiding in a few days. It is frequently attended with considerable pain and tenderness.

Treatment.—As a rule, hot water or poppy fomentations are most useful as local applications in the earlier stages; they should be applied uently; when the little boil is nearly ripe it l be poulticed, and it should be lanced if the pain is unusually severe. The bowels should be carefully attended to, and tonics, with generous diet, given throughout; preparations of iron are the most generally useful.

TARSAL CYST.

Chalazion, Meibomian Cyst, Tarsal Tumour.

A small tumour, generally solitary, and affecting the upper lid, though it may affect either lid and be multiple; it is rare in children and elderly people.

Symptoms.—A small, hard, painless tumour about the size of a small pea, though sometimes considerably larger, situated at some little distance from the lid-margin; the skin is freely movable over it. If the lid be everted the conjunctiva over the swelling will appear of a dark red or purple colour. No pain is experienced except it becomes inflamed or suppurates.

Prognosis.—It may remain unchanged, or grow slowly larger, for months, or even years, but will probably become inflamed after a time, and will eventually suppurate. If properly treated it will never return, but it is not unlikely that fresh cysts will sooner or later make their appearance.

Treatment.—Evert the upper lid and make a crucial incision into the cyst through the conjunctiva. If the contents are purulent, no further treatment is for the time necessary, but if, as is generally the case, the contents are semi-solid they should be removed by means of a small scoop, used somewhat freely. The cavity of the cyst then generally fills with blood, so that the tumour looks as large as before. The operation just mentioned is often all that is necessary, for the swelling generally becomes less and less, until at length it disappears. Sometimes, however, the crucical incision has to be repeated after a few weeks, and to avoid any possibility of this, it is better to prevent the incisions healing too quickly, by the occasional use of a probe for a few days after the operation.

Entropion, Trichiasis, Distichiasis, Ectropion.

In entropion the margin of one or more of the lids is inverted; in ectropion it is everted; in trichiasis the lashes are more or less irregularly displaced; in distichiasis the lashes are arranged more or less regularly in two rows, one of which is generally displaced.

As the treatment of malpositions of eyelids and eyelashes is almost entirely operative, I shall ot attempt to describe it in these pages.

CHAPTER XIX.

EPIPHORA.

UNDER this heading I propose to include all cases of watery eye, whether arising on the one hand from hypersecretion of the lachrymal fluid, or on the other hand from some mechanical obstacle to its flowing off by the natural passages. When arising from the latter cause the case is frequently called one of *stillicidium lachrymarum*, but it seems hardly necessary to retain the term.

Epiphora from hypersecretion is very frequently met with in the various diseases and injuries of the cornea, conjunctiva, and other structures of the eye, and under these circumstances it is generally described as *lachrymation.*

Epiphora from some mechanical obstacle to the tears flowing off by the natural passages may be due—

1. To displacement of one or both puncta.
2. To obstruction at the punctum, at the lower end of the nasal duct, or at any intermediate part of the lachrymal passages.

Epiphora due to Displacement of one or both Puncta.

As the lower punctum appears to do the lion's share of the work, any displacement of it more readily produces epiphora than any similar malposition of the upper punctum. The displacement may be caused by—

1. Thickening or eversion of the lid, such as is frequently met with in cases of granular lid, severe tinea, or burns, or other injuries of cheek, lid, &c.
2. By the lid, and consequently the punctum, not being in apposition with the eyeball; this is extremely common in old people, and is also sometimes met with in cases of facial paralysis.

Epiphora due to Obstruction at the Punctum, at the Lower End of the Nasal Duct, or at some Intermediate Point.

When the obstruction is at the punctum, careful investigation will elicit that it does not present a normal appearance.

When the obstruction is situated somewhere *between the* punctum and the lachrymal sac, we can diagnose its existence by the presence of epiphora, and the absence of evidence pointing to any other cause of it. One obvious cause of obstruction in this situation is division of the canaliculus, the result of some injury to the lid.

When, however, the obstruction is situated in some part of the nasal duct, a fresh symptom is generally met with, for pressure externally to the lachrymal sac will, as a rule, squeeze mucus or muco-purulent matter out of one of the puncta, though occasionally it will make its way down the nasal duct in preference. Sometimes the distension of the sac (*mucocele*) is evidenced externally by a small globular swelling between the bridge of the nose and the inner canthus. When the obstruction is situated in some part of the nasal duct, inflammation of the lachrymal sac not unfrequently occurs sooner or later. Epiphora, from one cause or another, may be met with at any age, and the same remark applies to epiphora which is due to stricture only. In like manner it may affect one or both eyes.

Prognosis.—The prognosis will of course vary with the nature of the cause which has produced the epiphora. Epiphora due to hypersecretion will probably disappear when the exciting cause *is removed.* Epiphora due to displacement of the punctum will of course continue as long as the malposition remains unrectified. Epiphora due to obstruction can only be cured by its removal. The prognosis, in case of treatment directed to this end, depends much upon whether the treatment be skilfully, and, above all, perseveringly carried out; if it be so, considerable benefit will be derived from it in a large proportion of cases, though the number of absolute cures is smaller than might be expected.

When epiphora has lasted a long time, the edges of the lids are often much irritated, and the conjunctiva gradually becomes considerably affected; moreover, in cases of obstruction of the nasal duct, chronic or even acute inflammation of the lachrymal sac is by no means uncommon.

Treatment.—When epiphora is due to hypersecretion, attention must of course be paid to the inflammation or irritation which has given rise to it. When epiphora is due to a displaced punctum, unless this appears to be but a temporary condition, the canaliculus attached to it should as a rule be laid open into the lachrymal sac, and the same remark applies to all cases of obstruction between the punctum and the sac. If, however, the obstruction is in the nasal duct, not only must the same treatment be adopted, but a probe must be passed down the nasal duct in addition.

It is not, however, my intention to enter into any details respecting the operative treatment of epiphora, for even in the skilled hands of the ophthalmic surgeon there are few cases requiring greater skill and perseverance, the treatment often extending over many months; and as, moreover, few general practitioners possess the instruments required for these operations, I have the more reason for not wasting my reader's time in describing how they should be used.

In almost all cases of epiphora an astringent wash can be prescribed with advantage, especially, however, in cases attended with a mucous or muco-purulent discharge; alum, zinc, and lead lotions are the best for the purpose. An alum wash (gr. ij–iv ad ℥j aquæ) is to be strongly recommended, but occasionally a solution of acetate of lead (gr. v ad ℥j aquæ) is more useful. In all cases where pressure over the lachrymal sac with the points of the fingers causes mucus or muco-purulent matter to exude from one of the puncta, directions should be given for the process to be repeated several times daily, and for the astringent wash to be used as soon as the discharge has been removed.

Inflammation of the Lachrymal Sac (Dacryo-cystitis.)

Dacryo-cystitis is almost always preceded by epiphora, and very generally by mucocele. It is characterized by an exquisitely tender swelling between the inner canthus and side of nose, the skin over it being frequently of a dusky red colour, and the tissues in the immediate neighbourhood being either brawny or œdematous; the swelling sometimes extends to the eyelids, nose, and cheek. Very considerable pain is often experienced; the complaint is almost always restricted to one side. It is almost invariably due to the mucous membrane of the lachrymal sac being in an unhealthy state, the result generally of some obstruction in the nasal duct; but it is probable that the actual exciting cause of the inflammation is for the most part some congestion, or low inflammatory condition, of the mucous membrane either of nostril or of conjunctival sac.

Diagnosis.—The localized tenderness over the sac; the restriction of the swelling to one side of the face (save in the rare cases when both sacs are inflamed), and to the neighbourhood of the sac *especially*; the history of long-standing epiphora, *and possibly* of mucocele, will generally suffice for distinguishing between dacryo-cystitis and erysipelas, the only other disease for which it is likely to be mistaken.

Prognosis.—If left alone the purulent contents of the sac will ultimately make their way to the surface just below the tendo palpebrarum, and then the inflammatory symptoms will gradually subside; in many cases, however, a fistulous opening into the sac remains, and there is considerable liability of fresh abscesses forming from time to time. If the disease be seen sufficiently early, and be judiciously treated, neither of these dangers need as a rule be feared.

Treatment.—In all cases of dacryo-cystitis, the part must be fomented first with hot water, and poultices should be applied; but if it is believed that matter has formed, it should be let out as soon as possible. If seen sufficiently early, this had better be done by slitting up the lower canaliculus into the sac; but, if the abscess be pointing superficially, an incision should be made just beneath the tendo palpebrarum, and extending downwards and outwards. The incision in the latter case should be dressed for a day or two with a strip of oiled lint to prevent it closing too rapidly. In any case the canaliculus must be *slit, and the* nasal duct probed as soon as the *inflammatory* swelling has subsided.

PART II.

INJURIES OF THE EYE AND EYELIDS.

I.—INJURIES OF THE EYELIDS.

CHAPTER XX.

Ecchymosis, Emphysema, Wounds, Burns, Scalds, Stings.

ECCHYMOSIS of the eyelids (*black eye*) scarcely needs to have its symptoms detailed, but it is important to bear in mind the distinctions between them and those which accompany the extravasation of blood which follows a fracture of the orbit.

In the former the discoloration appears almost immediately after the injury.

In the latter only after some considerable time has elapsed.

In the former it is thoroughly superficial.

In the latter it is deep seated.

In the former it appears first at the anterior part of the orbit.

In the latter it appears there last of all.

Treatment.—Cold in some form or other should be applied as soon as possible. A very excellent remedy is a lotion of tincture of arnica (℥ss ad ℥viij aquæ) ; pieces of linen rag dipped in this lotion are to be placed on the closed lids, and changed at frequent intervals. Another well-known remedy is a poultice made from scrapings of black bryony and bread-crumbs. Under no circumstances should the lids be pricked, lest suppuration be induced.

Emphysema of the Eyelids.

Emphysema of the lids makes it appearance after blowing the nose or sneezing, when the nasal mucous membrane has been ruptured, in cases of fracture of the nasal bones, ethmoidal cells, &c. It may, of course, be easily recognized by the swelling of the lids, which crepitates on palpation with the fingers.

Treatment.—A tolerably thick compress over the lids, a pressure-bandage, and strict abstinence in the matter of blowing the nose, will cure this little complaint in a few days.

Wounds of the Eyelids.

The edges of the wound should be brought *together* as accurately as possible, special attention being paid to the sutures which unite its extremities. If the wound involve the cartilage, a very small harelip-pin should be used with a twisted suture; and in case the wound is a very ragged one it is advisable to pare its edges before inserting the pin. If the canaliculus be cut through, what remains intact of it should be slit up into the lachrymal sac. These wounds heal very quickly, but considerable deformity may result if they are left alone.

Burns and Scalds of the Eyelids.

Burns and scalds of the lids must be treated much as they would be in other parts of the body; lint or rag dipped in *carron oil* (equal parts of linseed oil and lime-water) laid on the closed lids, covered with cotton wool, and kept in place by a pressure-bandage, will generally soon bring about a cure. The eyelids should be kept bandaged until quite healed.

Stings of Insects on the Eyelids.

The lids are sometimes much inflamed, the result of stings by wasps, bees, and other insects. *The first thing* to do is to search for the sting, and to remove it when found. Rags dipped in cold water, wet tobacco, cold bread and water poultices, and evaporating lotions, are all more or less of use.

II.—INJURIES OF THE EYE.

CHAPTER XXI.

Hæmorrhage into the Conjunctiva, Wounds of the Conjunctiva, Abrasions of the Cornea.

HÆMORRHAGE into the conjunctiva may be due to a variety of causes, and sometimes no cause can be discovered. The absence of all inflammatory symptoms, and the presence of the extravasated blood in the conjunctiva, distinguish this from all other conjunctival affections. No treatment is necessary.

Wounds of the Conjunctiva.

These seldom need any treatment save the application of a cold-water compress over the closed lids, and the use of a weak alum or zinc lotion if the healing stage is unduly prolonged. One or more sutures are, however, required if the conjunctiva is not merely lacerated, but partly detached from the globe and hanging loose. In all these cases we must take care to ascertain whether the sclerotic has escaped injury.

Abrasions of the Cornea.

The symptoms of an abrasion or superficial wound of the cornea are, considerable vascularity, especially in the peri-corneal region, much lachrymation, and not unfrequently a more or less contracted pupil (smaller than in the other eye). On careful examination, the abrasion can be detected on the surface of the cornea, though sometimes not without difficulty (for method of examining cornea by artificial light, *see* page 8). Generally there is marked photophobia and considerable pain.

Prognosis.—In young and healthy persons abrasions of the cornea heal very quickly, but in the old or feeble, obstinate ulceration or suppurative corneitis with hypopyon, &c., are not unfrequent complications.

Treatment.—First put a drop of atropine (atrop. sulph. gr. iv ad ℥j aquæ) into the affected eye, and a few minutes later one of olive or castor oil. After this a compress, formed of one or two pieces of wetted lint or old linen rag, should be laid on the closed lids, and secured by one or two turns of a bandage round the head. When there is much pain and irritation the compress can be previously wetted with poppy or belladonna fomentation (ext. belladon. ʒ–ʒij ad Oj aquæ). The atropine can be repeated once or twice a day, and the oil also as long as there is much irritation. If the pain is severe, an opiate should be given at bedtime. If symptoms of ulceration or suppurative corneitis make their appearance, the treatment must be varied accordingly (see Treatment of Ulcers and Suppurative Corneitis).

CHAPTER XXII.

FOREIGN BODIES.

(1.) *On or in the ocular or palpebral conjunctiva.*

(2.) *On or in the cornea.*

When, from the symptoms and the history of the case, there is any possibility of a foreign body being the cause of the mischief, it is always wise to thoroughly scrutinize the cornea, and conjunctiva, both ocular and palpebral, paying especial attention to the under surface of the upper lid, and, *à fortiori*, to the upper *cul de sac.*

Foreign Bodies on or in the Ocular or Palpebral Conjunctiva.

A foreign body may be found in literally any part of either ocular or palpebral conjunctiva, but small objects are generally found on the under surface of the upper lid, near the free border, and larger objects, as a rule, in the upper sulcus, as far up as they can go.

Symptoms.—Considerable peri-corneal vascularity; profuse lachrymation, especially when the eye is examined; a feeling of something in the eye, and in case the foreign body is under the upper lid, severe irritative pain when any attempt is made to raise it. In some cases these symptoms are traced to a given moment, before which none of them were noticed.

Diagnosis.—The acuteness of the symptoms, the suddenness of their onset, the very distinct sensation of something being in the eye, the history of the case, and the fact that only one eye is affected, generally point clearly to the true nature of the case, of which, however, the discovery of the foreign body is the only proof. In some cases, however, few if any of the above symptoms are found, or they are not well marked, or they do not occur until after a considerable interval of time has elapsed, and in these cases the presence of a foreign body is often overlooked, and the eye may be under treatment for months, for some supposed inflammatory affection. Serious results to the eye sometimes ensue from this oversight.

Treatment.—The foreign body should be removed as soon as detected. If quite on the surface of the conjunctiva it can be wiped off without difficulty; if partly embedded in it, a *reign body* needle, or spud, should be used for its removal; when deeply embedded, it and the conjunctiva over it should be seized with a pair of forceps, and the conjunctiva sufficiently divided with a knife or pair of scissors to allow of the foreign body being removed. Immediately afterwards a wet compress should be placed on the closed lids, and kept in place by a bandage. If the eye remain irritable, it should be bathed several times a day with poppy fomentation.

Foreign Bodies on or in the Cornea.

All sorts of foreign bodies, organic and inorganic, are found on the surface, or embedded in the substance of the cornea. When very minute they are sometimes not easily detected, but lateral illumination is of great service in discovering them (*see* page 8).

Symptoms.—A well marked vascular zone round the cornea; considerable lachrymation; the pupil frequently smaller than in the other eye; marked photophobia, though in some cases much less than in others, and considerable pain or discomfort.

Diagnosis.—The same remarks apply to the diagnosis of foreign bodies on or in the cornea, *as on or in the* conjunctiva (see preceding page).

Prognosis.—A foreign body embedded in the cornea, if not removed, may, after a time, make its way out by ulceration, or it may, though it rarely does, become more or less encysted; more generally it acts as a chronic irritant, or sets on foot increased inflammatory action, terminating possibly in some serious complication; for more or less extensive corneitis, ulceration, suppurative corneitis, or iritis, with hypopyon, are sometimes met with, especially in neglected cases. After removal of the foreign body the symptoms generally subside, leaving but little trace of what has occurred, but occasionally the corneitis, &c., may continue, though the exciting cause has been removed.

Treatment.—The surgeon who is not accustomed to ophthalmic operations will do well to leave to a more experienced operator the task of removing a foreign body which is deeply embedded in the cornea. If, however, the offending particle is only slightly embedded in it, he should endeavour to remove it;* but if he finds it difficult to do so he should not persist unduly in the attempt. After a piece of iron has been removed, a brownish stain is often left behind, but this may be disregarded, as it will probably disappear before long. After the foreign body has been removed, the same treatment must be adopted as in cases of abrasions of the cornea (*see* p. 124).

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* *Removal of Foreign Bodies from the Cornea.*—The patient should be seated in a chair, leaning his head against the chest of the surgeon, who stands behind him, *and* with the fore and middle fingers of his left hand *draws* the upper lid upwards and over the eyeball, and

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presses sufficiently upon the latter to steady it. It is also an advantage to have the lower lid depressed by an assistant. The offending particle, if only superficially embedded in the cornea, can be easily removed by a foreign body needle, or by any sharp-pointed instrument which may be available. This is best done by a succession of little scrapes with the point of the instrument, whereby the foreign body is picked out of its bed, care being taken to hold and use the instrument in such a manner that it will not penetrate the cornea, if the patient unexpectedly roll his eye upwards. A foreign body can also be removed by inserting a sharp-pointed instrument or foreign body scoop beneath it, and then lifting it out of its bed.

CHAPTER XXIII.

INJURIES OF THE EYE FROM FIRE, MOLTEN LEAD, ETC.; FROM QUICK-LIME, LIME, MORTAR, ETC.; FROM ACIDS, CAUSTIC ALKALIES, AND OTHER CHEMICAL AGENTS.

Injuries of the Eye from Fire, Molten Lead, &c.

THERE is the greatest possible variety in the injuries thus produced, for they vary from slight congestion and irritation of cornea and conjunctiva, to severe inflammation or even charring of the tissues involved. The affected parts of the conjunctiva speedily become of a greyish white, or ashen grey colour, whilst the corneal mischief is less quickly apparent; by degrees, however, a more or less nebulous patch will show itself, which ultimately becomes a more or less opaque and depressed scar. In severe cases extensive corneitis, ulceration of the cornea or conjunctiva, or even extensive sloughing of these tissues, may be met with.

Diagnosis.—This is rendered easy by the history of the case.

Prognosis.—A guarded prognosis should be given at first, as it is impossible to say to what depth the tissues are involved, and much also depends upon whether the eye keeps free from the complications already mentioned. Opacity of the cornea, and more or less extensive symblepharon (adhesion of eyeball to eyelid), are very common consequences of these injuries.

Treatment.—First, thoroughly examine the eye in order to remove any particles of metal, &c., which may be on or more or less embedded in its surface. A foreign body scoop or needle is best suited for removal of such irritant particles. Next put a drop of atropine (atrop. sulph. gr. j–ij ad ℥j aquæ) into the eye, and a minute or two after several drops of castor or olive oil; then apply cold, wet compresses by means of an ordinary roller-bandage. Both the atropine and the oil can be repeated two or three times a day for a while. At a later stage warm belladonna or poppy fomentations (ext. belladon. ʒj–ʒij ad Oj aquæ) are of much service, both for bathing the eye and for wetting the compresses. In less severe cases, when the discharge has become abundant, an alum lotion (gr. ij ad ℥j aquæ) may be used two or three times a day. When there is much pain and irritation an opiate should be given at bed-time, and three or four leeches can be applied to the temple. It is well to move the lids several times a day, to lessen the danger of extensive adhesions taking place between eyeball and eyelids.

Injuries of the Eye from Quick-lime, Lime, Mortar, &c.

The remarks just made respecting the injuries resulting from fire, molten lead, &c., are equally applicable to those which are the result of lime and its various combinations. It should, however, be noticed that in the case of the more powerful preparations of lime, or of the less powerful, when they have been allowed to remain in contact with the eye for a considerable time, the damage sustained by the tissues is as a rule more serious than from injuries by fire, molten lead, &c. This is especially the case with quick-lime, and the prognosis is very grave when even a small portion of this destructive agent has been allowed to remain in the eye for more than a very short time.

Treatment.—The treatment after injuries by lime and its combinations is identical with that recommended in the last section for injuries from fire, &c., save in one important particular—

namely, that after the upper lid has been everted, and its conjunctiva as well as the surface of the eye generally, has been freed from all particles of lime that are adherent to it, the next step in the treatment consists of freely syringing the eye with warm water, taking care not to lose an unnecessary moment. It is true that a weak solution of vinegar, or of dilute acetic acid (one drachm of either to an ounce or an ounce and a-half of water), is to be preferred for this purpose to simple warm water, especially in cases seen soon after the lime has entered the eye; but time is of such importance in these cases, that it is advisable to begin syringing with warm, or even, if necessary, with cold water, whilst the weak acid solution is being prepared by some one else.

Injuries of the Eye from Acids, Caustic Alkalies, and other Chemical Agents.

What has been already said respecting injuries from fire, molten lead, &c., applies almost equally well to the class of injuries we are now discussing, and the treatment of both is pretty much identical, only in the present class of injuries, free syringing with warm water is the first step in the treatment. Whilst this is being done, a solution of the chemical antidote to the irritant in question should be prepared. For example, if an acid has occasioned the injury, a solution of the carbonate or bicarbonate of soda or potash (gr. v ad ℥j aquæ) should be made, and the eye freely washed with it. This alkaline solution should be used whether the acid be strong or much diluted. In the case of a strong alkali, a solution of vinegar or dilute acetic acid (ʒj ad ℥j aut ℥iss aquæ) should be used in like manner.

CHAPTER XXIV.

Perforating Wounds of the Cornea and Sclerotic; Rupture of the Eyeball; Dislocation of the Lens into the Anterior Chamber.

PERFORATING wounds of the cornea are generally complicated by prolapse of iris or traumatic cataract, and not unfrequently by both; in either case they require watchful treatment, sometimes extending over several months; when, however, they are uncomplicated they generally heal rapidly.

Perforating wounds of the sclerotic, even when uncomplicated by prolapse of iris or by extensive escape of vitreous, are more serious than similar wounds of the cornea, and, when they involve the ciliary region, are extremely dangerous, on account of their liability to set on foot sympathetic ophthalmia in the other eye.

Rupture of the eyeball almost always takes place through the sclerotic, not far from the corneal margin; it is always a very serious accident, and the prognosis, so far as retaining even a small amount of sight is concerned, is extremely grave.

Treatment.—The uncomplicated wounds of the cornea are best treated by putting a drop of atropine (atrop. sulph. gr. i–ij ad ℥j aquæ) into the injured eye as soon as possible after the accident, and once or twice a day afterwards. Cold wet compresses should be applied by means of a bandage to the closed lids. If there is much pain or irritation, three or four leeches should be placed on the temple of the same side, and a belladonna fomentation (ext. belladon. ʒj–ʒij ad Oj aquæ) can be also ordered.

Wounds of the sclerotic, unless quite small, should be sewn up with fine silk, using a needle at each end of the thread, and working from within outwards with each needle.

It does not come within the province of this little work to describe the treatment of corneal wounds, when complicated with prolapse of iris or traumatic cataract; of extensive sclerotic wounds, involving considerable loss of vitreous; of ruptures of the eyeball; and still less of wounds in the ciliary region, or of wounds caused by foreign bodies which remain inside the eyeball, except in so far as it has already been touched upon in the chapter on sympathetic ophthalmia.

Dislocation of the Lens into the Anterior Chamber.

Sometimes the lens is dislocated into the anterior chamber; and, as on the one hand, it is very easy to overlook it in this novel position, and, on the other hand, its presence there is fraught with grave danger to the eye, it is desirable in all cases of accident to make sure that this has not occurred.

Symptoms.—A lens dislocated into the anterior chamber presents a peculiar and characteristic appearance, which is not, however, very easily described; perhaps the best description of it is that by Mr. Lawson, who speaks of it as looking like a large drop of oil lying at the back of the cornea. The anterior chamber is considerably deepened by the iris being pushed backwards by the dislocated lens, and the pupil is more or less fixed and dilated. As a rule, the lens should be extracted when thus dislocated; but whether this should be done in any particular case is a question which the general practitioner should refer to the decision of a specialist.

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